



APPENDIX G

Conceptual Cost Estimates for Scenarios



Key Assumptions Included in Cost Estimates:

Groundwater treatment capital costs:

- Capital costs are American Association of Cost Engineering (AACE) Class 5 Estimate, with an accuracy range of -30% to +50%.
- Capital costs were based on design capacity of the treatment facility.
- Cr6 treatment design capacity was determined based on the well capacity provided by CVWD and a bypass approach.
- Product water storage was not included, considering system storage is based on other factors and CVWD has sufficient storage in most systems.
- Chlorination for disinfection was not included. It was confirmed with DDW that groundwater treatment does not result in mandatory CT requirements.
- Annualized capital cost is based on an interest rate of 5% and 20 years.
- The cost factors and engineering factors are listed in Tables 5-2 and 5-3.

Groundwater treatment O&M costs:

- O&M costs are AACE Class 5 Estimates, with an accuracy range of -30% to +50%.
- O&M costs include media replacements (such as resins, described in more detail as follows), labor, chemicals, residuals, electricity, lab and field analysis, and equipment maintenance.
- O&M costs do not include electricity for existing well pumping.
- Booster pumping was included to compensate the pressure loss through the Cr6 treatment processes.
- O&M costs were developed for two scenarios: 1) based on 2012 average production rates provided by CVWD and 2) based on 30% of well capacity as requested by CVWD as reflective of the system-wide annual average.
- Unit prices for chemicals, residuals disposal, labor and electricity are summarized in Table 5-4.

WBA treatment system costs:

- WBA process includes bag filters for particle removal, pH adjustment using carbon dioxide (CO₂), ion exchange vessels in a lead/lag configuration, and post pH adjustment using aeration.
- CO₂ was assumed to achieve a pH target of 6.0. CO₂ dose was estimated using the Rothberg Tamburini Winsor (RTW) model.
- For aeration, anti-scalant (polyphosphate) at a dose of 1 mg/L was included to minimize calcium carbonate precipitation in the aerator (actual dose is to be determined in preliminary design based on water quality and manufacturer recommendations). No aeration off-gas treatment was included.
- WBA resin life was assumed to be 367,600 BVs for the lead bed when the lag bed effluent achieves 2 µg/L. The bed volume estimate reflects the maximum number of bed volumes tested in the WBA pilot at CVWD, at which the Cr(VI) concentration in the treated water was between 4 and 5 µg/L in a single bed; therefore, this estimated resin life is a conservative assumption.
- 6 BVs of water were assumed for resin flushing during resin change-out. Wastewater was assumed to be temporarily stored in Baker tank(s) and disposed of as non-hazardous waste.



- Spent WBA was assumed as non-RCRA hazardous waste and TENORM (after blending with adsorbent) that can be disposed to US Ecology's landfill in Idaho (the same landfill that City of Glendale used for their spent WBA resin).
- The required labor was assumed to be 0.4 full time equivalent (FTE), 0.65 FTE, and 1.3 FTE for treatment production rate below 2,000 gpm, 2,000-4,000 gpm and above 4,000 gpm, respectively.

RCF treatment system costs:

- RCF treatment consists of ferrous sulfate addition, reduction tank (15-minute contact time), chlorination for residual ferrous iron oxidation (not to achieve disinfection residual), polymer addition, and granular media filtration.
- Filter backwash water was assumed to account for 3% of the total production flow.
- For RCF with recycle, all filter backwash water was assumed to be treated and recycled back to the head of the process. For RCF without recycle, all filter backwash water was assumed to be discharged to the sewer without treatment.
- Granular media was assumed to be replaced 10% every year, which is included in O&M cost.
- Cr6 treatment target assumed to be 5 µg/L for RCF based on findings of total chromium removal by this process.
- For RCF without recycle, the required labor was assumed to be 1.3 FTE, 2.0 FTE, and 2.6 FTE for treatment production rate below 2,000 gpm, 2,000-4,000 gpm and above 4,000 gpm, respectively.
- For RCF with recycle, the required labor was assumed to be 2.0 FTE, 2.6 FTE, and 3.9 FTE for treatment production rate below 2,000 gpm, 2,000-4,000 gpm and above 4,000 gpm, respectively. Addition of the recycle component has been shown to require more operational attention at Cr6 treatment facilities.

RCMF treatment system costs:

- RCMF treatment consists of ferrous sulfate addition, reduction tank (15-minute contact time), chlorination for residual ferrous iron oxidation (not to achieve disinfection residual), and microfiltration.
- Wastewater was assumed to account for 5% of the total production flow.
- MF membrane life was assumed to be 10 years. O&M cost includes replacement cost for 10% of the membranes every year.
- All wastewater was assumed to be discharged to the sewer. Backwash was assumed to be discharged without treatment. Wastewater containing chemicals was assumed to be dechlorinated and neutralized before discharge. Wastewater recycle was not considered in this cost estimate, although it may be feasible for water conservation.
- Cr6 treatment target was assumed to be 2 µg/L for RCMF based on findings of total chromium removal by this process.
- The required labor was assumed to be 1.3 FTE, 2.0 FTE, and 2.6 FTE for treatment production rate below 2,000 gpm, 2,000-4,000 gpm and above 4,000 gpm, respectively.

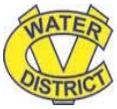


SBA single pass treatment system costs:

- SBA process includes bag filters for particle removal and ion exchange vessels.
- Resin is replaced once Cr6 in treated water reaches the treatment target.
- Resin replacement frequency is dependent on maximum historical sulfate concentration in raw water and a function of bed volumes versus sulfate discussed in the SBA technology section. Raw water Cr6 concentration was assumed to have no significant effect on resin operational life.
- Spent resin was assumed as non-hazardous waste.
- The required labor was assumed to be 0.4 FTE, 0.65 FTE, and 1.3 FTE for treatment production rate below 2,000 gpm, 2,000-4,000 gpm and above 4,000 gpm, respectively.

SBA with onsite regeneration treatment system costs:

- SBA process includes bag filters for particle removal, ion exchange vessels in a parallel configuration, resin regeneration and spent brine treatment process. Each system includes a minimum of 2 vessels plus a standby/regen vessel.
- A caustic soda feed system was included for wells with raw water calcium carbonate precipitation potential (CCPP) below zero.
- SBA resin life was assumed to be 4 years.
- Resin regeneration frequency is based on maximum historical sulfate concentration in raw water and a function of bed volumes versus sulfate as discussed in the SBA section. Raw water Cr6 concentration was assumed to have no significant effect on resin operational life.
- Resin regeneration procedure consists of backwash (1 BV), regen (12% brine, 4 BVs total comprised of 3 BVs to be recycled and 1 BV to waste), slow rinse (1 BVs, 0.5 BV to be recycled and 0.5 BV to waste) and fast rinse (3 BVs all to waste). The procedure needs to be validated and potentially optimized for different water qualities.
- Spent brine and slow rinse waste need to be treated before disposal. Backwash and fast rinse waste are non-hazardous and contain low TDS and can be disposed to sewer without treatment. Recycle of slow rinse waste, backwash waste and fast rinse waste may be feasible.
- Spent brine treatment was based on a 7:1 iron-to-Cr6 ratio, which is effective at CVWD's IXTPs. This iron dose is expected to be more than needed for Cr6 spent brine treatment. A lower iron dose is expected to generate a large cost saving. The optimal iron dose will be tested in a jar testing.
- Treated brine was assumed to be non-hazardous but with high TDS, which would be hauled off-site for disposal.
- Dewatered solids are non-RCRA hazardous waste due to chromium concentration. The dewatered solid quantity was estimated using mass balance, assuming all chromium and iron are settled and removed as dewatered solids. Moisture content was assumed 80%, based on results observed at Glendale for dewatered solids.
- For SBA with onsite regeneration, the required labor was assumed to be 1.3 FTE, 2.0 FTE, and 2.6 FTE for treatment production rate below 2,000 gpm, 2,000-4,000 gpm and above 4,000 gpm, respectively.

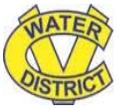


SBA with central regeneration treatment system costs:

- SBA process at well sites includes bag filters for particle removal, ion exchange vessels in a parallel configuration. Each system includes 2 vessels. Each vessels holds 600 cf resin to maximize resin volume per transportation for central regeneration.
- A caustic soda feed system was included for wells with raw water calcium carbonate precipitation potential (CCPP) below zero.
- SBA resin life was assumed to be 4 years.
- All SBA resin regeneration was assumed to take place at a central resin regeneration facility.
- Resin regeneration frequency is based on maximum historical sulfate concentration in raw water and a function of bed volumes versus sulfate as discussed in the SBA section. Raw water Cr6 concentration was assumed to have no significant effect on resin operational life.
- Same regeneration procedures as for SBA with onsite regeneration except that the backwash and fast rinse water can also be reused for plant water.
- Same spent brine treatment procedures as for SBA onsite regeneration.
- Treated brine was assumed to be non-hazardous and disposed of off site.
- An alternative that was included in the capital cost is evaporation ponds, which could minimize brine. Additional analysis is necessary based on pilot testing to determine the most cost effective brine minimization and disposal option. O&M costs for disposal of solids from the evaporation ponds are not included since treated brine off site disposal was used in the estimates. If more cost effective, O&M costs for disposal of solids from evaporation ponds would substitute for the treated brine costs.
- For the CRRF operations, the required labor was assumed to be 6 FTE at the plant and 4 FTE for resin transfer/trucks.
- The required labor for each well site was assumed to be 0.4 FTE for a production rate of 2,000 gpm.

Groundwater treatment land, building and pipeline costs:

- Land costs for sites that require land procurement were provided by CVWD on a case-by-case basis.
- Building cost was estimated for clusters to include all equipment indoor except CO₂ tank for WBA. Unit building cost of \$268/sf, which was provided by CVWD for mansard roof design.
- Recessed vessels and roofs were estimated for individual SBA sites on a case-by-case basis. In general, recessed vessels and roofs were considered for sites in sensitive neighborhoods or close to residential areas. An estimated cost of \$0.5M was included for recessed vessels and roofs per site.
- Pipeline costs were estimated to connect raw water from all wells to the treatment site and treated/blended water to the existing distribution system. For individual sites with too small of a space for treatment onsite, pipelines were estimated to connect the well site to the treatment site and the treated water to existing distribution systems. The unit cost for pipelines was assumed \$15.83 per feet per inch diameter installed.



Surface water treatment costs:

- Capital costs are AACE Class 5 Estimate, with an accuracy range of -30% to +50%.
- Capital costs were based on design capacity of the treatment facility, which included 15 MGD of surface water treatment and 5 MGD of groundwater pre-treatment at the surface water treatment plant. An additional 15 MGD of groundwater was assumed to bypass the treatment facilities and be blended in the clearwell.
- Cost estimates for flocculation and settling were based on reinforced concrete basins with chain and flight scrapers. Basins were not assumed to be covered.
- Cost estimates for DAF were based on use of reinforced concrete basins. The basins were assumed to be covered with a canopy.
- Cost estimates for granular media filtration assume reinforced concrete filters with enclosed filter galleries.
- Cost estimates for membrane filtration assume that membrane units will be enclosed in a masonry building.
- Cost estimates for all technologies included screens, inlet pumping, chemical storage and dosing facilities, post treatment with GAC. These costs are unaffected by the various technology considered. All estimates also include solids handling; the level of cost varies with the treatment technology.
- Chlorine system for disinfection was included. Chlorine disinfection was assumed to be using sodium hypochlorite. All product water, including bypassed groundwater was assumed to be chlorinated. The mandatory CT was calculated in accordance with the USEPA Guidance Manual.
- Annualized capital cost is based on an interest rate of 5% and 20 years.
- The cost factors and engineering factors are listed in Tables 6-9 and 6-10.

Surface water treatment O&M costs:

- O&M costs are AACE Class 5 Estimate, with an accuracy range of -30% to +50%.
- O&M costs include labor, chemicals, residuals disposal, electricity, lab and field analysis, and equipment maintenance.
- O&M costs do not include electricity for existing well pumping or for the operation of the Mid Valley Pumping Station. Pumping of finished water to distribution was assumed to include 15 MGD of bypassed groundwater.
- O&M costs were based on a 20 MGD treatment plant plus 15 MGD of bypassed groundwater.
- Unit prices for chemicals, residuals disposal, labor and electricity are summarized in Table 6-11.

Surface water treatment land, building and pipeline costs:

- Land costs for a surface water plant in the East Valley were based on estimate land values provided by CVWD. The surface water plant in the Mid Valley was assumed to be built on land already owned by CVWD. No land cost was included for this option.
- Pipeline costs were estimated for raw water pipelines leading to the treatment sites and distribution pipeline from the surface water plant to accessible points in the existing distribution



system. The unit cost for pipelines was assumed \$15.83 per feet per inch in diameter installed as recommended by CVWD. The Mid Valley estimate assumed that raw water would be transported using the existing Mid Valley Pipeline.

POU costs:

- For purposes of cost estimation, it is assumed that all customers do not already have installed POU treatment devices.
- 260 working days a year (excluding weekends).
- Timeline for installation would include one year for legislative and regulatory amendments to allow POU for CVWD, and four years for procurement and installation.
- Program Administration: 1 full time staff member for supervision and customer service scheduling and 10 assistants split between the residential and commercial customer classes to schedule and administer the installations.
- Public Outreach is already being conducted for chromium 6 and would require no additional costs.
- Training will be provided for both installation and O&M, using a staff of 4 instructors.
- Number of RO units is based on water meter count for residential customers. The number of RO units for Public Agency, Business, and Commercial is based on the number of Water Units for each class. The number of units for Hotel/Motels are based on the total estimated number of hotel rooms in the Coachella Valley area.
- Cost of a single RO unit (Kinetico Aquakinetik A200) is about \$636 each when purchased in bulk (20% discount).
- Additional totalizing flow meters to go along with each RO unit would have to be purchased with a price of \$200 each.
- Vehicle cost for capital purchase is \$21,686 per vehicle. There would be one vehicle per installer.
- Vehicle cost for operations is \$.503/mile which includes fuel, insurance, maintenance, salvage etc.
- Average distance traveled: approximate 18 mile distance to each customer.
- The number of installers required at an efficiency of 2 units installed per day = 43 installers required.
- Cost of plumber tools set is assumed to be \$850 each, with one tool set per installer.
- Counter and Sink Repairs: Assume that 10% of installations would require counter and sink repairs, with the cost of repair to be \$700 each.
- Assume an hourly wage of \$35.58/hour for installers.
- Labor hours are calculated from the number of RO units, 1056 working days to install the systems, 10 hour work days, and 2 installations per day. The calculation is as follows: (number of RO units)*(1/1056 days)*(1 installer/2 units per day)*1056 days*(10 hours/day) = total hours.
- Continued training during installation is estimated to take place every year.
- Inspections for quality control: assume that random inspections are done each month, with a sample of 10% of the number of installed units from each month.
- Procurement cost is assumed to be 10% of total installation cost, including procurement documents, arranging logistics, handling bids, etc.
- Contingency is assumed to be 30% of total installation cost for the residential systems, and 40% for non-residential systems which will require more customization.



- For O&M Labor, assume that one technician can visit 10 homes a day and that all RO units must be visited each year.
- O&M Transportation: The mileage should be the same as for installation because the same number of customers would be visited but in this case each year. The technician can in this case visit 10 homes in the same neighborhood in a single day, resulting in the same total miles driven per day and per year.
- Lab analysis costs \$57.50 per sample, in which all RO units need to be sampled each year.
- Cost of replacement filters is assumed to be \$87 for each set when purchased in bulk and filters must be replaced every year.
- Cost of replacement membranes is assumed to be \$120 and must be replaced each year.
- Record Keeping and Administration Labor assumes that the administrator and clerks are retained for supervision of yearly operations and maintenance.
- Disposal cost: based on a price quote from Burrtec Waste Industries for a commercial dumpster, the cost would be \$1622.28/year for 1 dumpster.
- Contingency is assumed to be 40% of total O&M cost. This contingency is conservative given the high level of uncertainties associated with installing RO units in public agencies with drinking fountains rather than sinks as well as with the installation of units in food service businesses.
- Annualized Initial Capital Cost is calculated with an interest rate of 5% and a service life of 20 years.
- Total annual cost is the sum of annualized initial capital cost and annual O&M cost.
- Monthly cost to customers is the total annual cost divided by the number of RO units divided by 12 months.

Scenario 1 Clustered Treatment (Production Rates Based on 2012 Rates)

Assumptions			
Proposed MCL (µg/L)	10		
Bypass Treatment at 80% of MCL (µg/L)	8	Cost of Piping (\$/ft/in installed)	\$ 15.83
Bypass Acceptable? (Y/N)	Y	Building Cost (\$/sf)	\$ 268
Finished Cr6 Goal after Blending (µg/L)	6	Rate	5%
Treated Cr6 for WBA, SBA and RCMF (µg/L)	2	Years	20
Treated Cr6 for RCF (µg/L)	5		

Treatment Groups	Group	Grouped Wells (Red - Tier 1; Yellow - Tier 2; Blue - blending wells)	Number of Wells with Cr6 above 8 µg/L	Pressure Zone	Design Capacity (gpm)	2012 Average Production Rate (gpm)	SBA, WBA and RCMF			RCF			Treatment Capital Costs (\$M)						Annual O&M Cost (\$M/year)						Annualized Treatment Cost (\$M/yr)						Cost Summary in \$M						
							Bypass for SBA, WBA and RCMF (%)	Treatment Design Capacity (gpm)	Average Production Rate (gpm)	Bypass for RCF (%)	Treatment Design Capacity (gpm)	Average Production Rate (gpm)	WBA	SBA- on-site regen	SBA- single pass	RCF- with recycle	RCF- without recycle	RCMF- without recycle	WBA	SBA- on-site regen	SBA- single pass	RCF- with recycle	RCF- without recycle	RCMF- without recycle	WBA	SBA- on-site regen	SBA- single pass	RCF- with recycle	RCF- without recycle	RCMF- without recycle	Selected Treatment Technology	Treatment Capital Cost	Total Capital Cost (treatment, pipe, sewer, building and land)	O&M	NPV	Total Annualized Cost (\$M/yr)	Total Unit Cost (\$/AF)
GroupA	3405-1, 3408-1, 3409-2, 3410-1		4	Area 26	6,500	2,256	25%	4,851	1,684	8%	5,991	2,079	\$ 13.4	\$ 10.9	\$ 6.2	\$ 18.4	\$ 10.3	\$ 13.7	\$ 1.3	\$ 0.8	\$ 84.6	\$ 1.7	\$ 0.9	\$ 0.8	\$ 2.3	\$ 1.8	\$ 65.1	\$ 3.2	\$ 1.7	\$ 1.9	WBA	\$ 13.4	\$ 17.4	\$ 1.26	\$ 33.1	\$ 2.7	\$ 731
GroupB	4524-1, 4525-1, 4557-1, 4521-1 (Blend)		2	Date Palm	7,061	3,250																															
GroupC	4828-2, 4830-1, 4831-2		3	Sky Mountain	5,500	1,030	41%	3,272	613	15%	4,700	880	\$ 9.7	\$ 8.2	\$ 4.3	\$ 15.2	\$ 9.4	\$ 9.9	\$ 0.8	\$ 0.3	\$ 4.5	\$ 0.9	\$ 0.5	\$ 0.5	\$ 1.6	\$ 1.0	\$ 4.9	\$ 2.1	\$ 1.3	\$ 1.3	SBA	\$ 8.2	\$ 13.9	\$ 0.32	\$ 17.9	\$ 1.4	\$ 866
GroupD	4907-2, 4908-1, 4910-1		3	Mission Hills	6,200	1,690	44%	3,478	948	16%	5,185	1,413	\$ 10.2	\$ 8.6	\$ 4.8	\$ 16.7	\$ 9.7	\$ 10.4	\$ 0.9	\$ 0.3	\$ 3.6	\$ 1.2	\$ 0.7	\$ 0.6	\$ 1.7	\$ 1.0	\$ 4.0	\$ 2.6	\$ 1.4	\$ 1.4	SBA	\$ 8.6	\$ 13.8	\$ 0.33	\$ 17.9	\$ 1.4	\$ 527
GroupE	4910-1, 4913-1, 4914-2		3	Sky Mountain	6,000	440	35%	3,889	285	12%	5,263	397	\$ 11.1	\$ 9.5	\$ 5.3	\$ 17.0	\$ 9.8	\$ 11.4	\$ 0.8	\$ 0.3	\$ 1.7	\$ 0.6	\$ 0.4	\$ 0.4	\$ 1.7	\$ 1.1	\$ 2.1	\$ 2.0	\$ 1.2	\$ 1.3	SBA	\$ 9.5	\$ 14.4	\$ 0.34	\$ 18.7	\$ 1.5	\$ 2,114
GroupF	4911-1, 4912-1, 4930-1 (Blend)		1	Sky Mountain	5,495	1,520																															
GroupG	5676-2, 5677-1, 5678-1, 5658-1		4	Sky Mountain	7,523	4,080	37%	4,743	2,572	13%	6,561	3,558	\$ 13.1	\$ 10.9	\$ 6.3	\$ 21.3	\$ 10.7	\$ 13.5	\$ 1.5	\$ 0.6	\$ 14.8	\$ 2.6	\$ 1.3	\$ 1.1	\$ 2.6	\$ 1.4	\$ 15.3	\$ 4.3	\$ 2.2	\$ 2.2	SBA	\$ 10.9	\$ 16.8	\$ 0.57	\$ 25.8	\$ 2.1	\$ 316
GroupH	6832-2, 6864-1, 6865-1, 6878-1, 6879-2 (New)		5	Valley	9,503	4,650	29%	6,708	3,247	9%	8,606	4,166	\$ 17.7	\$ 13.4	\$ 8.5	\$ 28.6	\$ 11.9	\$ 18.2	\$ 2.0	\$ 0.7	\$ 27.7	\$ 3.1	\$ 1.6	\$ 1.4	\$ 3.4	\$ 1.7	\$ 28.4	\$ 5.4	\$ 2.5	\$ 2.9	SBA	\$ 13.4	\$ 25.0	\$ 0.66	\$ 33.9	\$ 2.7	\$ 360
GroupI	4720-1, 4721-1, 4722-1, 5719-1, 5720-1		5	Sun City	10,400	1,760	27%	7,542	1,276	8%	9,500	1,608	\$ 19.7	\$ 14.3	\$ 9.3	\$ 35.0	\$ 12.4	\$ 20.2	\$ 1.7	\$ 0.6	\$ 36.8	\$ 1.6	\$ 0.8	\$ 0.8	\$ 3.3	\$ 1.8	\$ 39.5	\$ 4.0	\$ 1.8	\$ 2.4	SBA	\$ 14.3	\$ 29.2	\$ 0.80	\$ 32.7	\$ 2.6	\$ 927
GroupJ	5713-1, 5714-1, 5715-1, 5717-1, 5718-1		5	La Quinta	10,000	950	42%	5,816	553	15%	8,476	805	\$ 15.7	\$ 12.3	\$ 7.4	\$ 28.1	\$ 11.8	\$ 16.0	\$ 1.3	\$ 0.4	\$ 3.7	\$ 1.0	\$ 0.6	\$ 0.5	\$ 2.5	\$ 1.4	\$ 4.3	\$ 3.2	\$ 1.5	\$ 1.8	SBA	\$ 12.3	\$ 20.7	\$ 0.40	\$ 25.8	\$ 2.1	\$ 1,352
GroupK	5717-2, 5717-2, 5718-1, 5719-1, 5725-1, 5727-1		5	La Quinta	10,000	4,560	44%	5,614	2,560	16%	8,366	3,815	\$ 15.2	\$ 12.2	\$ 7.4	\$ 27.7	\$ 11.8	\$ 15.6	\$ 1.6	\$ 0.7	\$ 34.0	\$ 2.8	\$ 1.4	\$ 1.2	\$ 2.8	\$ 1.6	\$ 34.5	\$ 5.0	\$ 2.3	\$ 2.4	SBA	\$ 12.2	\$ 24.0	\$ 0.65	\$ 32.1	\$ 2.6	\$ 390
GroupL	6701-1, 6702-1		2	La Quinta	3,500	2,500	33%	2,333	1,667	11%	3,111	2,222	\$ 7.5	\$ 6.6	\$ 3.4	\$ 10.4	\$ 8.0	\$ 7.6	\$ 0.8	\$ 0.4	\$ 6.3	\$ 1.7	\$ 0.9	\$ 0.7	\$ 1.4	\$ 0.9	\$ 6.6	\$ 2.5	\$ 1.5	\$ 1.3	SBA	\$ 6.6	\$ 10.9	\$ 0.38	\$ 15.7	\$ 1.3	\$ 313
GroupM	6724-1, 6725-1, 6726-1		3	Calhulla	6,000	3,060	37%	3,785	1,930	13%	5,234	2,669	\$ 10.9	\$ 9.2	\$ 5.0	\$ 16.9	\$ 9.8	\$ 11.1	\$ 1.1	\$ 0.5	\$ 28.4	\$ 2.0	\$ 1.0	\$ 0.9	\$ 2.0	\$ 1.2	\$ 28.8	\$ 3.4	\$ 1.8	\$ 1.7	WBA	\$ 10.9	\$ 16.8	\$ 1.12	\$ 30.8	\$ 2.5	\$ 501
GroupN	6805-1, 6806-1		2	Middletown	4,400	240	22%	3,436	187	7%	4,111	224	\$ 10.1	\$ 8.7	\$ 4.7	\$ 13.3	\$ 8.9	\$ 10.3	\$ 0.7	\$ 0.3	\$ 1.6	\$ 0.5	\$ 0.3	\$ 0.3	\$ 1.6	\$ 1.0	\$ 2.0	\$ 1.6	\$ 1.0	\$ 1.2	SBA	\$ 8.7	\$ 12.1	\$ 0.31	\$ 16.0	\$ 1.3	\$ 3,315
Group O	6868-1 (Blend with 4562-1)		1	Date Palm	3,909	2,590																															
Group P	6902-2 (Blend with 5838-1)		1	Valley	3,851	2,470																															
Group Q	6882-1 (Blend with 5870-1)		1	Valley	3,480	1,500																															
Group R	5709-1 (Blend with 5712-1)		1	La Quinta	3,850	640																															
Indiv 1	6929-1		1	Valley	1,500	599	52%	721	269	21%	1,181	441	\$ 3.7	\$ 2.8	\$ 1.2	\$ 5.0	\$ 5.4	\$ 3.7	\$ 0.3	\$ 0.2	\$ 0.9	\$ 0.6	\$ 0.3	\$ 0.3	\$ 0.6	\$ 0.4	\$ 1.0	\$ 1.0	\$ 0.8	\$ 0.6	SBA	\$ 2.8	\$ 3.7	\$ 0.20	\$ 6.2	\$ 0.5	\$ 553
Indiv 2	6725-1		1	Calhulla	2,200	1,020	27%	1,613	748	8%	2,017	935	\$ 5.8	\$ 5.1	\$ 2.5	\$ 7.3	\$ 6.7	\$ 5.9	\$ 0.5	\$ 0.3	\$ 1.8	\$ 0.9	\$ 0.5	\$ 0.4	\$ 1.0	\$ 0.7	\$ 2.0	\$ 1.4	\$ 1.0	\$ 0.9	SBA	\$ 5.1	\$ 6.0	\$ 0.29	\$ 9.6	\$ 0.8	\$ 469
Indiv 3	6734-1		1	Calhulla	2,000	270	33%	1,333	180	11%	1,776	240	\$ 4.4	\$ 3.7	\$ 2.0	\$ 6.6	\$ 6.4	\$ 5.2	\$ 0.4	\$ 0.2	\$ 0.5	\$ 0.5	\$ 0.3	\$ 0.3	\$ 0.8	\$ 0.6	\$ 0.6	\$ 1.0	\$ 0.8	\$ 0.7	SBA	\$ 4.3	\$ 5.2	\$ 0.21	\$ 7.9	\$ 0.6	\$ 1,451
Indiv 4	6907-1		1	Mecca	1,805	760	60%	727	306	27%	1,317	555	\$ 3.7	\$ 3.0	\$ 1.4	\$ 5.4	\$ 5.7	\$ 3.8	\$ 0.3	\$ 0.2	\$ 1.3	\$ 0.6	\$ 0.3	\$ 0.3	\$ 0.6	\$ 0.5	\$ 1.4	\$ 1.1	\$ 0.8	\$ 0.6	SBA	\$ 3.0	\$ 3.9	\$ 0.23	\$ 6.7	\$ 0.5	\$ 440
Indiv 5	6724-1 (Blend with distribution water)		1	Calhulla	1,500	130	44%	833	72	17%	1,250	106																									
Totals			56					59,860	19,025		81,417	25,999																									
Tier 1			31																																		
Tier 2			25																																		

Tier	Sum of Capital Costs	Annual O&M Costs	Number of Wells
Tier 1	\$ 203	\$ 6.0	31
Tier 2	\$ 44	\$ 1.7	25
Total	\$ 248	\$ 7.7	56

Tier	Wellhead Treatment	Building	Clustering Pipelines	Land	Transfer Site
Tier 1	\$ 134	\$ 16	\$ 57	\$ 2.6	\$ 8.4
Tier 2	\$ 10	\$ 2	\$ 13	\$ -	\$ 1.8
Total	\$ 144	\$ 18	\$ 70	\$ 2.6	\$ 10

Scenario 1 Clustered Treatment (Production Rates Based on 30% Well Capacities

a 4776 1433 5962 1789
 i 7580 2274 9515 2854
 j 6063 1819 8603 2881
 n 3509 1053 4137 1241

Assumptions		
Proposed MCL (µg/L)	10	
Assume Treatment at 80% of MCL (µg/L)	8	Cost of Piping (\$/ft) installed) \$ 15,83
Bypass Acceptable? (Y/N)	y	Building Cost (\$/sf)
Freshwater Goal after Blending (µg/L)	3	Rate
Treated Crf for WBA, SBA and RCMF (µg/L)	2	Years
Treated Crf for RCF (µg/L)	5	

Group	Grouped Wells (Red - Tier 1; Yellow - Tier 2; Blue - Standby wells)	Number of Wells with Crf above 8 µg/L	Pressure Zone	Design Capacity (gpm)	Production Rate at 30% Well Capacity (gpm)	SBA, WBA and RCMF		RCF		Treatment Capital Costs (\$M)						Annual O&M Costs (\$M/year)						Annualized Treatment Cost (\$M/y)						Unit Treatment Cost (\$/AF)						Cost Summary (\$M)								
						Bypass for SBA, WBA and RCMF (%)	Treatment Design Capacity (gpm)	Treatment Average Production Rate (gpm)	Bypass for RCF (%)	Treatment Design Capacity (gpm)	Treatment Average Production Rate (gpm)	WBA	SBA	single pass	RCF with recycle	RCF without recycle	RCMF without recycle	WBA	SBA	single pass	RCF with recycle	RCF without recycle	RCMF without recycle	RCMF without recycle	WBA	SBA	single pass	RCF with recycle	RCF without recycle	RCMF without recycle	Selected Treatment Technology	Treatment Capital Cost (treatment, pipe, sewer, building and land)	Total Annualized Cost (\$M/y)	IO&M	NPV	Total Annualized Cost (\$M/y)	Total Unit Cost (\$/AF)					
GroupA	3405-1, 3408-1, 3409-2, 3410-1	4	Area 26	6,500	1,950	29%	4,851	1,455	8%	5,991	1,797	\$ 13.4	\$ 10.9	\$ 8.2	\$ 19.4	\$ 10.3	\$ 13.7	\$ 1.21	\$ 2.21	\$ 73.19	\$ 1.47	\$ 0.76	\$ 0.74	\$ 2.3	\$ 3.1	\$ 73.7	\$ 3.0	\$ 1.6	\$ 1.8	\$ 728	\$ 981	\$ 23,427	\$ 961	\$ 508	\$ 585	WBA	\$ 13.4	\$ 17.4	\$ 1.21	\$ 32.5	\$ 2.6	\$ 831
GroupB	4524-1, 4525-1, 4527-1, 4527-1 (standby)	2	Star Palm	2,671	2,118																																					
GroupC	4628-2, 4630-1, 4631-2	3	Sky Mountain	5,500	1,650	41%	3,272	981	10%	4,700	1,410	\$ 9.7	\$ 8.2	\$ 4.3	\$ 16.2	\$ 9.4	\$ 9.9	\$ 0.86	\$ 0.35	\$ 7.15	\$ 1.22	\$ 0.64	\$ 0.57	\$ 1.6	\$ 1.0	\$ 7.5	\$ 2.4	\$ 1.4	\$ 1.4	\$ 613	\$ 381	\$ 2,815	\$ 915	\$ 523	\$ 511	SBA	\$ 8.2	\$ 13.9	\$ 0.35	\$ 18.3	\$ 1.5	\$ 552
GroupD	4637-1, 4638-1, 4639-1	3	Mission Hills	6,200	1,860	46%	3,478	1,043	10%	5,185	1,556	\$ 10.2	\$ 8.6	\$ 4.8	\$ 16.7	\$ 9.7	\$ 10.4	\$ 0.91	\$ 0.34	\$ 8.99	\$ 1.31	\$ 0.89	\$ 0.89	\$ 1.7	\$ 1.0	\$ 4.4	\$ 2.7	\$ 1.6	\$ 1.4	\$ 595	\$ 342	\$ 4,454	\$ 885	\$ 490	\$ 474	SBA	\$ 8.6	\$ 13.8	\$ 0.34	\$ 17.9	\$ 1.4	\$ 481
GroupE	4610-1, 4613-1, 4613-2	3	Sky Mountain	6,000	1,800	30%	3,889	1,167	12%	5,293	1,588	\$ 11.1	\$ 9.5	\$ 5.3	\$ 17.0	\$ 9.8	\$ 11.4	\$ 1.02	\$ 0.39	\$ 4.44	\$ 1.33	\$ 0.79	\$ 0.64	\$ 1.9	\$ 1.2	\$ 6.9	\$ 2.7	\$ 1.5	\$ 1.5	\$ 660	\$ 398	\$ 2,364	\$ 930	\$ 512	\$ 524	SBA	\$ 9.5	\$ 14.4	\$ 0.39	\$ 19.3	\$ 1.5	\$ 555
GroupF	4611-1, 4617-1, 4620-1 (Standby)	1	Sky Mountain	5,495	1,649																																					
GroupG	4616-1, 4617-1, 4628-1, 4629-1	4	Sky Mountain	7,923	2,367	30%	4,743	1,423	13%	6,561	1,968	\$ 13.1	\$ 10.5	\$ 5.3	\$ 23.3	\$ 13.7	\$ 13.5	\$ 1.24	\$ 0.43	\$ 4.24	\$ 1.55	\$ 0.82	\$ 0.74	\$ 2.3	\$ 1.3	\$ 8.7	\$ 3.3	\$ 1.7	\$ 1.8	\$ 430	\$ 369	\$ 2,420	\$ 306	\$ 462	\$ 458	SBA	\$ 10.5	\$ 16.6	\$ 0.43	\$ 24.2	\$ 1.8	\$ 624
GroupH	4632-1, 4684-1, 4685-1, 4687-1, 4687-2 (IN)	5	Valley	8,563	2,551	29%	6,709	2,012	9%	8,606	2,582	\$ 17.7	\$ 13.4	\$ 8.5	\$ 28.6	\$ 17.9	\$ 18.2	\$ 1.72	\$ 0.59	\$ 17.28	\$ 2.98	\$ 1.69	\$ 1.94	\$ 3.1	\$ 1.7	\$ 18.0	\$ 4.4	\$ 2.0	\$ 2.5	\$ 689	\$ 562	\$ 3,909	\$ 948	\$ 446	\$ 544	SBA	\$ 13.4	\$ 26.0	\$ 0.59	\$ 32.3	\$ 2.6	\$ 565
GroupI	4726-1, 4731-1, 4732-1, 4733-1, 4734-1, 4735-1	5	San Jose	10,200	3,060	30%	7,245	2,285	9%	8,650	2,595	\$ 18.7	\$ 14.3	\$ 8.8	\$ 32.0	\$ 18.4	\$ 22.2	\$ 1.91	\$ 0.71	\$ 26.97	\$ 2.95	\$ 1.68	\$ 1.74	\$ 3.5	\$ 2.0	\$ 24.8	\$ 6.3	\$ 2.8	\$ 2.8	\$ 854	\$ 548	\$ 3,777	\$ 956	\$ 432	\$ 549	SBA	\$ 14.3	\$ 25.2	\$ 0.71	\$ 35.1	\$ 2.8	\$ 724
GroupJ	4731-1, 4731-1, 4731-1, 4737-1, 4738-1	5	La Quinta	10,000	3,000	42%	5,916	1,745	10%	8,476	2,543	\$ 15.7	\$ 12.3	\$ 7.4	\$ 28.1	\$ 11.8	\$ 16.0	\$ 1.52	\$ 0.63	\$ 11.41	\$ 2.08	\$ 1.09	\$ 0.89	\$ 2.8	\$ 1.6	\$ 12.0	\$ 4.3	\$ 2.0	\$ 2.2	\$ 574	\$ 333	\$ 2,480	\$ 892	\$ 422	\$ 450	SBA	\$ 12.3	\$ 20.7	\$ 0.63	\$ 28.5	\$ 2.3	\$ 474
GroupK	4711-1, 4711-2, 4715-1, 4725-1, 4727-1	5	La Quinta	10,000	3,000	44%	5,614	1,684	10%	8,369	2,516	\$ 15.2	\$ 12.2	\$ 7.4	\$ 27.7	\$ 11.8	\$ 16.0	\$ 1.40	\$ 0.61	\$ 22.98	\$ 2.02	\$ 1.07	\$ 0.84	\$ 2.6	\$ 1.5	\$ 23.0	\$ 4.2	\$ 2.0	\$ 2.1	\$ 542	\$ 308	\$ 4,748	\$ 876	\$ 216	\$ 431	SBA	\$ 12.2	\$ 24.0	\$ 0.61	\$ 30.3	\$ 2.4	\$ 504
GroupL	4701-1, 4701-1	2	La Quinta	3,500	1,050	30%	2,353	700	11%	3,111	933	\$ 7.5	\$ 6.6	\$ 3.4	\$ 10.4	\$ 6.0	\$ 7.6	\$ 0.61	\$ 0.32	\$ 7.72	\$ 0.99	\$ 0.49	\$ 0.46	\$ 1.2	\$ 0.8	\$ 3.0	\$ 1.7	\$ 1.1	\$ 1.1	\$ 772	\$ 488	\$ 1,794	\$ 1,020	\$ 664	\$ 630	SBA	\$ 6.6	\$ 10.9	\$ 0.32	\$ 14.9	\$ 1.2	\$ 705
GroupM	4724-1, 4725-1, 4726-1	3	Cahulla	6,000	1,800	30%	3,785	1,135	13%	5,234	1,570	\$ 10.9	\$ 9.2	\$ 5.0	\$ 18.9	\$ 9.8	\$ 11.1	\$ 0.97	\$ 0.42	\$ 16.78	\$ 1.32	\$ 0.69	\$ 0.63	\$ 1.8	\$ 1.2	\$ 17.2	\$ 2.7	\$ 1.5	\$ 1.5	\$ 636	\$ 399	\$ 5,915	\$ 522	\$ 509	\$ 523	WBA	\$ 10.9	\$ 16.8	\$ 0.69	\$ 28.9	\$ 2.3	\$ 789
GroupN	4691-1, 4691-1	2	Mission Hills	4,400	1,320	25%	3,426	1,021	7%	4,111	1,233	\$ 10.1	\$ 8.7	\$ 4.7	\$ 13.3	\$ 8.3	\$ 10.3	\$ 0.91	\$ 0.35	\$ 8.98	\$ 1.10	\$ 0.59	\$ 0.59	\$ 1.7	\$ 1.3	\$ 8.4	\$ 3.2	\$ 1.8	\$ 1.4	\$ 687	\$ 587	\$ 3,965	\$ 1,021	\$ 610	\$ 667	SBA	\$ 8.7	\$ 12.1	\$ 0.59	\$ 18.0	\$ 1.6	\$ 717
GroupO	4646-1 (standby with 4563-1)	1	Date Palm	3,809	1,173																																					
GroupP	4637-1 (standby with 4533-1)	1	Valley	3,651	1,095																																					
GroupQ	4637-1 (standby with 4533-1)	1	Valley	3,450	1,044																																					
GroupR	4738-1 (standby with 4732-1)	1	La Quinta	3,850	1,150																																					
Indp-1	4624-1	1	Valley	1,500	400	52%	721	216	21%	1,181	354	\$ 3.7	\$ 2.8	\$ 1.2	\$ 3.0	\$ 3.4	\$ 3.7	\$ 0.26	\$ 0.20	\$ 0.41	\$ 0.51	\$ 0.29	\$ 0.27	\$ 0.6	\$ 0.4	\$ 0.5	\$ 0.5	\$ 0.7	\$ 0.6	\$ 782	\$ 583	\$ 694	\$ 1,250	\$ 1,003	\$ 781	SBA	\$ 2.8	\$ 3.7	\$ 0.29	\$ 6.2	\$ 0.9	\$ 685
Indp-2	4628-1	1	Cahulla	2,200	660	27%	1,613	484	8%	2,017	605	\$ 5.8	\$ 5.1	\$ 2.5	\$ 7.3	\$ 8.7	\$ 5.9	\$ 0.46	\$ 0.27	\$ 1.18	\$ 0.68	\$ 0.38	\$ 0.37	\$ 0.9	\$ 0.7	\$ 1.4	\$ 1.3	\$ 0.9	\$ 0.8	\$ 888	\$ 636	\$ 1,295	\$ 1,182	\$ 860	\$ 793	SBA	\$ 5.1	\$ 6.0	\$ 0.27	\$ 9.4	\$ 0.8	\$ 709
Indp-3	4634-1	1	Cahulla	2,000	600	30%	1,393	409	11%	1,779	533	\$ 4.1	\$ 3.3	\$ 1.9	\$ 6.8	\$ 6.4	\$ 5.2	\$ 0.41	\$ 0.22	\$ 0.51	\$ 0.63	\$ 0.35	\$ 0.34	\$ 0.8	\$ 0.6	\$ 0.7	\$ 1.2	\$ 0.9	\$ 0.8	\$ 847	\$ 584	\$ 994	\$ 1,190	\$ 899	\$ 782	SBA	\$ 4.3	\$ 5.2	\$ 0.22	\$ 8.0	\$ 0.6	\$ 665
Indp-4	4634-1	1	Mecca	1,800	540	30%	1,260	378	11%	1,517	455	\$ 3.2	\$ 2.0	\$ 1.1	\$ 4.1	\$ 4.7	\$ 3.8	\$ 0.21	\$ 0.22	\$ 0.51	\$ 0.53	\$ 0.31	\$ 0.27	\$ 0.5	\$ 0.5	\$ 0.6	\$ 1.0	\$ 0.8	\$ 0.6	\$ 581	\$ 336	\$ 714	\$ 1,104	\$ 872	\$ 651	SBA	\$ 3.0	\$ 3.9	\$ 0.22	\$ 6.7	\$ 0.5	\$ 612
Indp-5	4623-1 (standby with distribution water)	1	Cahulla	1,500	450	30%	946	284	13%	1,309	393																															
Totals		56								69,860	17,958																															
Tier 1		31								81,417	24,425																															
Tier 2		25																																								

Tier	Sum of Capital Costs	Annual O&M Costs	Number of Wells
Tier 1	\$ 293	\$ 7.0	31
Tier 2	\$ 144	\$ 7.7	25
Total	\$ 248	\$ 8.6	56

Tier	Wellhead Treatment	Buildings	Clustering Pipelines	Land	Transfer Site
Tier 1	\$ 134	\$ 16	\$ 57	\$ 2.6	\$ 8.4
Tier 2	\$ 101	\$ 2	\$ 13	\$ 1	\$ 7.8
Total	\$ 144	\$ 18	\$ 70	\$ 2.6	\$ 10

Scenario 2. Individual Well Treatment with CRRF (Production Rates Based on 2012 Rates)

- * Individual SBA treatment systems at most sites with central regeneration
- * Some clusters where cost effective or operationally advantageous

Assumptions		
Proposed MCL (µg/L)	10	
Assume Treatment at 80% of MCL (µg/L)	8	Cost of Piping (\$/ft installed) \$ 16.83
Bypass Acceptable? (Y/N)	Y	Building Cost (\$/sf) \$ 284
Finished C&G Coal after Blending (µg/L)	6	Rate \$ 29
Treated C&G for RCF (µg/L)	5	20
Treated C&G for WBA, SBA and RCMF (µg/L)	2	Resin regen cost (\$/ft) \$ 29
Resin Volume per SBA Vessel (cf)	800	

Individual SBA Treatment Systems with Central Regeneration

Count No.	Well ID (Red - Tier 1; Yellow - Tier 2)	Pressure Zone	SBA, WBA, RCMF			RCF			Treatment Capital Costs (\$M)						Annual O&M Costs (\$M/year)						Annualized Treatment Cost (\$M/yr)						Cost Summary (\$M)										
			Design Capacity (gpm)	2012 Production Rate (gpm)	Bypass (%)	Treatment Design Capacity (gpm)	Treatment Average Production Rate (gpm)	Bypass for RCF (%)	Treatment Design Capacity for RCF (gpm)	Treatment Average Production Rate for RCF (gpm)	WBA	SBA-CRRF	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMF-without recycle	WBA	SBA-CRRF	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMF-without recycle	WBA	SBA-CRRF	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMF-without recycle	Selected Treatment Technology	Treatment Capital Cost	Total Capital (treatment, pipe, sewer, building and land)	O&M	NPV	Total Annualized Cost (\$M/yr)	Total Water Cost (\$/AF)		
1	4511-1	Sky Mountain	2,000	230	51%	974	112	21%	1,983	182	\$ 4.3	\$ 3.0	\$ 1.7	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.27	\$ 0.02	\$ 0.20	\$ 0.42	\$ 0.26	\$ 0.25	\$ 0.22	\$ 0.34	\$ 0.51	\$ 0.75	\$ 0.60	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.02	\$ 3.2	\$ 0.25	\$ 887			
2	4512-2	Mission Hills	2,200	770	48%	1,152	403	19%	1,753	527	\$ 4.7	\$ 3.0	\$ 1.5	\$ 6.6	\$ 6.6	\$ 4.9	\$ 0.39	\$ 0.07	\$ 0.61	\$ 0.68	\$ 0.38	\$ 0.33	\$ 0.77	\$ 0.31	\$ 0.76	\$ 1.22	\$ 0.88	\$ 0.72	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.07	\$ 3.8	\$ 0.11	\$ 911		
3	4516-1	Mission Hills	2,000	500	50%	1,000	250	20%	1,600	400	\$ 5.4	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.31	\$ 0.04	\$ 0.38	\$ 0.55	\$ 0.32	\$ 0.29	\$ 0.65	\$ 0.26	\$ 0.68	\$ 0.28	\$ 0.52	\$ 1.04	\$ 0.81	\$ 0.64	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.04	\$ 3.5	\$ 0.28	\$ 845
4	4511-1	Mission Hills	2,000	420	36%	1,273	267	13%	1,750	368	\$ 5.0	\$ 3.0	\$ 2.1	\$ 6.5	\$ 6.3	\$ 5.1	\$ 0.38	\$ 0.05	\$ 0.44	\$ 0.53	\$ 0.31	\$ 0.28	\$ 0.82	\$ 0.33	\$ 0.66	\$ 1.09	\$ 0.86	\$ 0.75	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.05	\$ 4.1	\$ 0.33	\$ 863		
5	4511-1	Sky Mountain	2,000	140	27%	1,461	103	8%	1,833	128	\$ 6.4	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.4	\$ 5.5	\$ 0.37	\$ 0.05	\$ 0.28	\$ 0.38	\$ 0.25	\$ 0.24	\$ 0.81	\$ 0.25	\$ 0.45	\$ 0.95	\$ 0.74	\$ 0.74	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.05	\$ 4.3	\$ 0.26	\$ 1,154		
6	4511-1	Sky Mountain	2,000	120	36%	1,273	70	1%	1,750	106	\$ 5.0	\$ 3.0	\$ 2.1	\$ 6.5	\$ 6.3	\$ 5.1	\$ 0.34	\$ 0.05	\$ 0.22	\$ 0.38	\$ 0.25	\$ 0.24	\$ 0.74	\$ 0.23	\$ 0.38	\$ 0.90	\$ 0.76	\$ 0.65	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.05	\$ 3.1	\$ 0.25	\$ 1,384		
7	4511-1	Sky Mountain	2,000	180	49%	1,012	91	20%	1,658	145	\$ 4.4	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.30	\$ 0.02	\$ 0.21	\$ 0.40	\$ 0.25	\$ 0.24	\$ 0.65	\$ 0.26	\$ 0.35	\$ 0.89	\$ 0.74	\$ 0.60	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.02	\$ 3.2	\$ 0.26	\$ 879		
8	4526-2	Valley	2,000	550	33%	1,333	367	11%	1,778	493	\$ 6.1	\$ 3.0	\$ 2.1	\$ 6.6	\$ 6.4	\$ 5.2	\$ 0.41	\$ 0.08	\$ 0.63	\$ 0.60	\$ 0.34	\$ 0.33	\$ 0.95	\$ 0.44	\$ 0.93	\$ 1.28	\$ 0.98	\$ 0.83	SBA-CRRF	\$ 3.0	\$ 4.6	\$ 0.08	\$ 5.5	\$ 0.44	\$ 495		
9	4511-1	Sky Mountain	1,500	360	52%	721	269	21%	1,181	441	\$ 3.7	\$ 3.0	\$ 1.4	\$ 5.0	\$ 5.4	\$ 3.1	\$ 0.27	\$ 0.00	\$ 0.48	\$ 0.58	\$ 0.32	\$ 0.28	\$ 0.56	\$ 0.29	\$ 0.60	\$ 0.98	\$ 0.70	\$ 0.58	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.06	\$ 3.7	\$ 0.29	\$ 229		
10	4511-1	Sky Mountain	2,000	190	44%	1,833	150	11%	1,250	233	\$ 4.0	\$ 3.0	\$ 1.8	\$ 5.2	\$ 5.1	\$ 4.0	\$ 0.29	\$ 0.00	\$ 0.60	\$ 0.44	\$ 0.27	\$ 0.25	\$ 0.7	\$ 0.86	\$ 0.89	\$ 0.75	\$ 0.62	SBA-CRRF	\$ 3.0	\$ 3.5	\$ 0.09	\$ 4.5	\$ 0.37	\$ 808			
11	4511-2	Sky Mountain	2,000	200	48%	1,048	105	19%	1,630	163	\$ 4.5	\$ 3.0	\$ 1.8	\$ 6.2	\$ 6.1	\$ 4.5	\$ 0.31	\$ 0.03	\$ 0.30	\$ 0.41	\$ 0.26	\$ 0.25	\$ 0.67	\$ 0.27	\$ 0.50	\$ 0.91	\$ 0.75	\$ 0.61	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.03	\$ 3.4	\$ 0.27	\$ 841		
12	4720-1	Sun City	2,000	320	35%	1,484	237	8%	1,540	294	\$ 5.9	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.9	\$ 5.8	\$ 0.40	\$ 0.09	\$ 0.73	\$ 0.49	\$ 0.30	\$ 0.29	\$ 0.84	\$ 0.31	\$ 0.84	\$ 1.03	\$ 0.81	\$ 0.74	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.09	\$ 4.1	\$ 0.23	\$ 835		
13	4721-1	Sun City	2,000	370	31%	1,385	256	10%	1,600	333	\$ 4.5	\$ 3.0	\$ 2.1	\$ 6.7	\$ 6.4	\$ 5.3	\$ 0.39	\$ 0.13	\$ 0.36	\$ 0.51	\$ 0.31	\$ 0.30	\$ 0.42	\$ 0.54	\$ 1.54	\$ 1.05	\$ 0.82	\$ 0.73	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.05	\$ 3.2	\$ 0.42	\$ 697		
14	4722-1	Sun City	2,000	380	29%	1,471	271	9%	2,000	345	\$ 6.7	\$ 3.0	\$ 2.1	\$ 7.2	\$ 6.7	\$ 5.8	\$ 0.42	\$ 0.31	\$ 0.45	\$ 0.63	\$ 0.31	\$ 0.31	\$ 0.82	\$ 0.58	\$ 4.68	\$ 1.14	\$ 0.89	\$ 0.81	SBA-CRRF	\$ 3.0	\$ 3.5	\$ 0.31	\$ 7.3	\$ 0.69	\$ 958		
15	4632-2	Valley	2,000	920	25%	1,500	690	8%	1,848	848	\$ 5.5	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.1	\$ 5.5	\$ 0.50	\$ 0.10	\$ 0.97	\$ 0.81	\$ 0.44	\$ 0.43	\$ 0.98	\$ 0.41	\$ 2.20	\$ 1.40	\$ 0.95	\$ 0.92	SBA-CRRF	\$ 3.0	\$ 3.5	\$ 0.13	\$ 6.1	\$ 0.41	\$ 276		
16	4657-2 (new)	Valley	2,000	1,000	29%	1,429	714	9%	1,818	909	\$ 5.4	\$ 3.0	\$ 2.1	\$ 6.7	\$ 6.4	\$ 5.5	\$ 0.48	\$ 0.12	\$ 0.92	\$ 0.85	\$ 0.45	\$ 0.43	\$ 0.91	\$ 0.86	\$ 1.11	\$ 1.39	\$ 0.98	\$ 0.87	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.12	\$ 4.4	\$ 0.38	\$ 221		
17	4661-1	Sky Mountain	1,523	870	53%	711	408	22%	1,185	677	\$ 3.7	\$ 3.0	\$ 1.4	\$ 5.0	\$ 5.4	\$ 3.1	\$ 0.30	\$ 0.07	\$ 0.61	\$ 0.69	\$ 0.38	\$ 0.32	\$ 0.99	\$ 0.31	\$ 0.72	\$ 1.10	\$ 0.81	\$ 0.62	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.07	\$ 3.8	\$ 0.31	\$ 280		
18	4661-1	Valley	1,563	440	38%	1,020	293	11%	1,336	391	\$ 4.4	\$ 3.0	\$ 1.8	\$ 5.4	\$ 5.7	\$ 4.5	\$ 0.34	\$ 0.09	\$ 0.48	\$ 0.51	\$ 0.31	\$ 0.30	\$ 0.73	\$ 0.31	\$ 0.67	\$ 1.01	\$ 0.80	\$ 0.69	SBA-CRRF	\$ 3.0	\$ 3.5	\$ 0.06	\$ 4.2	\$ 0.33	\$ 471		
19	4661-1	Valley	2,000	1,110	53%	847	528	22%	1,565	869	\$ 4.2	\$ 3.0	\$ 1.7	\$ 6.0	\$ 6.1	\$ 4.3	\$ 0.38	\$ 0.09	\$ 0.73	\$ 0.82	\$ 0.43	\$ 0.38	\$ 0.70	\$ 0.33	\$ 0.87	\$ 1.30	\$ 0.92	\$ 0.71	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.09	\$ 4.1	\$ 0.33	\$ 284		
20	4678-2	Sky Mountain	2,000	1,200	49%	838	638	13%	1,350	878	\$ 6.0	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.3	\$ 5.4	\$ 0.41	\$ 0.10	\$ 0.71	\$ 0.83	\$ 0.44	\$ 0.48	\$ 0.91	\$ 0.36	\$ 0.83	\$ 1.38	\$ 0.99	\$ 0.88	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.08	\$ 4.6	\$ 0.38	\$ 295		
21	4677-1	Sky Mountain	2,000	1,020	38%	1,273	643	13%	1,750	883	\$ 5.0	\$ 3.0	\$ 2.1	\$ 6.5	\$ 6.3	\$ 5.1	\$ 0.48	\$ 0.10	\$ 0.81	\$ 0.84	\$ 0.44	\$ 0.41	\$ 0.90	\$ 0.38	\$ 1.00	\$ 1.40	\$ 0.89	\$ 0.86	SBA-CRRF	\$ 3.0	\$ 3.5	\$ 0.10	\$ 4.7	\$ 0.38	\$ 231		
22	4678-1	Sky Mountain	2,000	1,190	31%	1,385	824	10%	1,800	1,071	\$ 5.3	\$ 3.0	\$ 2.1	\$ 6.7	\$ 6.4	\$ 5.3	\$ 0.51	\$ 0.18	\$ 1.19	\$ 0.94	\$ 0.49	\$ 0.48	\$ 0.93	\$ 0.38	\$ 1.37	\$ 1.48	\$ 1.00	\$ 0.89	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.16	\$ 4.9	\$ 0.39	\$ 205		
23	4678-1	Valley	2,000	1,130	22%	1,556	873	7%	1,867	1,055	\$ 5.7	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.5	\$ 5.8	\$ 0.54	\$ 0.10	\$ 2.00	\$ 0.93	\$ 0.49	\$ 0.48	\$ 1.44	\$ 0.41	\$ 2.25	\$ 1.52	\$ 1.05	\$ 0.98	SBA-CRRF	\$ 3.0	\$ 3.5	\$ 0.13	\$ 6.1	\$ 0.41	\$ 268		
24	4717-2	La Quinta	2,000	790	48%	1,038	409	19%	1,623	841	\$ 4.4	\$ 3.0	\$ 1.8	\$ 6.2	\$ 6.1	\$ 4.5	\$ 0.37	\$ 0.08	\$ 0.52	\$ 0.69	\$ 0.38	\$ 0.33	\$ 0.72	\$ 0.30	\$ 0.67	\$ 1.18	\$ 0.87	\$ 0.69	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.06	\$ 3.7	\$ 0.30	\$ 232		
25	4717-2	La Quinta	2,000	1,080	35%	1,333	927	11%	1,778	1,236	\$ 5.7	\$ 3.0	\$ 2.1	\$ 6.6	\$ 6.4	\$ 5.2	\$ 0.52	\$ 0.19	\$ 1.54	\$ 1.04	\$ 0.53	\$ 0.49	\$ 0.97	\$ 0.56	\$ 1.63	\$ 1.61	\$ 1.08	\$ 0.89	SBA-CRRF	\$ 3.0	\$ 3.5	\$ 0.15	\$ 6.8	\$ 0.76	\$ 487		
26	4717-2	La Quinta	2,000	1,450	49%	1,012	142	29%	1,568	223	\$ 4.4	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.5	\$ 0.31	\$ 0.02	\$ 0.27	\$ 0.44	\$ 0.27	\$ 0.25	\$ 0.64	\$ 0.27	\$ 0.54	\$ 0.81	\$ 0.61	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.02	\$ 3.3	\$ 0.29	\$ 983			
27	4717-1	La Quinta	2,000	200	52%	867	86	21%	1,574	157	\$ 4.3	\$ 3.0	\$ 1.7	\$ 6.0	\$ 6.1	\$ 4.3	\$ 0.27	\$ 0.03	\$ 0.21	\$ 0.40	\$ 0.26	\$ 0.24	\$ 0.61	\$ 0.25	\$ 0.30	\$ 0.89	\$ 0.74	\$ 0.59	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.03	\$ 3.1	\$ 0.25	\$ 779		
28	4717-1	La Quinta	2,000	180	50%	1,000	73	20%	1,600	120	\$ 4.3	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.5	\$ 0.27	\$ 0.02	\$ 0.29	\$ 0.38	\$ 0.25	\$ 0.24	\$ 0.61	\$ 0.26	\$ 0.40	\$ 0.67	\$ 0.74	\$ 0.59	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.02	\$ 3.3	\$ 0.26	\$ 1,088		
29	4717-1	La Quinta	2,000	180	44%	1,111	100	17%	1,667	150	\$ 4.6	\$ 3.0	\$ 1.8	\$ 6.3	\$ 6.2	\$ 4.7	\$ 0.32	\$ 0.01	\$ 0.19	\$ 0.40	\$ 0.26	\$ 0.25	\$ 0.69	\$ 0.25	\$ 0.35	\$ 0.91	\$ 0.70	\$ 0.62	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.05	\$ 3.1	\$ 0.25	\$ 870		
30	4717-1	La Quinta	2,000	150	40%	1,200	90	14%	1,714	128	\$ 4.8	\$ 3.0	\$ 2.0	\$ 6.4	\$ 6.3	\$ 4.9	\$ 0.33	\$ 0.01	\$ 0.21	\$ 0.39	\$ 0.25	\$ 0.23	\$ 0.75	\$ 0.20	\$ 0.41	\$ 0.65	\$ 0.60	\$ 0.68	SBA-CRRF	\$ 3.0	\$ 3.5	\$ 0.05	\$ 3.6	\$ 0.29	\$ 1,204		
31	4718-1	La Quinta	2,000	140	31%	1,395	107	10%	1,800	126	\$ 5.3	\$ 3.0	\$ 2.2	\$ 6.7	\$ 6.4	\$ 5.3	\$ 0.39	\$ 0.01	\$ 0.20	\$ 0.39	\$ 0.25	\$ 0.23	\$ 0.82	\$ 0.29	\$ 0.40	\$ 0.77	\$ 0.81	\$ 0.72	SBA-CRRF	\$ 3.0	\$ 3.5	\$ 0.05	\$ 3.7	\$ 0.29	\$ 1,298		
32	4718-1	Sun City	2,000	430	22%	1,711	334	7%	2,053	401	\$ 6.0	\$ 3.0	\$ 2.4	\$ 7.4	\$ 6.7	\$ 6.1	\$ 0.45	\$ 0.07	\$ 1.08	\$ 0.98	\$ 0.33	\$ 0.33	\$ 0.93	\$ 0.31	\$ 1.20	\$ 1.15	\$ 0.87	\$ 0.82	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.07	\$ 3.8	\$ 0.31	\$ 844		
33	4718-1	Sun City	2,000	360	33%	1,333	173	11%	1,778	231	\$ 5.1	\$ 3.0	\$ 2.1	\$ 6.6	\$ 6.4	\$ 5.2	\$ 0.47	\$ 0.05	\$ 0.41	\$ 0.49	\$ 0.28	\$ 0.27	\$ 0.78	\$ 0.28	\$ 0.54	\$ 0.88	\$ 0.79	\$ 0.69	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.06	\$ 3.6	\$ 0.28	\$ 614		
34	4718-1	La Quinta	2,000	1,260	42%	1,038	725	12%	1,523	1,136	\$ 4.4	\$ 3.0	\$ 1.8	\$ 6.2	\$ 6.1																						

Scenario 2. Individual Well Treatment with CRRF (Production Rates Based on 30% Well Capacities)

- * Individual SBA treatment systems at most sites with central regeneration
- * Some clusters where cost effective or operationally advantageous

Assumptions			
Proposed MCL (µg/l)	10		
Assume Treatment at 80% of MCL (µg/l)	8	Cost of Piping (\$/ft installed)	\$ 15.83
Bypass Acceptable? (Y/N)	y	Building Cost (\$/sf)	\$ 268
Treated Cr6 Cost after Blending (µg/l)	6	Rate	7%
Treated Cr6 for RCF (µg/l)	5	Years	5
Treated Cr6 for WBA, SBA and RCMF (µg/l)	2	Resin regen cost (\$/cf)	\$ 29
Resin Volume per SBA Vessel (cf)	600		

Individual SBA Treatment Systems

Count	Well ID (Red - Tier 1; Yellow - Tier 2)	Pressure Zone	Well Design Capacity (gpm)	Production Rate as 30% well capacity (gpm)	SBA, WBA, RCMF			RCF with and without recycle					Treatment Capital Costs (\$M)					Annual O&M Cost (\$M/year)					Annualized Treatment Cost (\$M/y)					Cost Summary (\$M)									
					Bypass (%)	Treatment Design Capacity (gpm)	Treatment Average Production Rate for RCF (gpm)	Bypass for RCF (%)	Treatment Design Capacity for RCF (gpm)	Treatment Average Production Rate for RCF (gpm)	WBA	SBA- CRRF	SBA- single pass	RCF- with recycle	RCF- without recycle	RCMF	WBA	SBA- CRRF	SBA- single pass	RCF- with recycle	RCF- without recycle	RCMF	WBA	SBA- CRRF	SBA- single pass	RCF- with recycle	RCF- without recycle	RCMF	Selected Treatment Technology	Treatment Capital Cost	Total Capital treatment pipes, sewer, building and land)	O&M	NPV	Total Annualized Cost (\$M/y)	Total Water Cost (\$/cf)		
1	4611-1	Sky Mountain	2,000	600	51%	574	292	21%	1,583	475	1,583	475	\$ 4.3	\$ 3.0	\$ 1.7	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.31	\$ 0.04	\$ 0.39	\$ 0.99	\$ 0.34	\$ 0.30	\$ 0.65	\$ 0.28	\$ 0.52	\$ 1.08	\$ 0.82	\$ 0.45	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.04	\$ 3.1	\$ 0.28	\$ 293
2	4612-2	Mission Hills	2,000	600	48%	1,152	348	19%	1,793	538	1,793	538	\$ 4.7	\$ 3.0	\$ 1.9	\$ 6.8	\$ 6.4	\$ 4.8	\$ 0.38	\$ 0.06	\$ 0.53	\$ 0.63	\$ 0.38	\$ 0.34	\$ 0.76	\$ 0.30	\$ 0.69	\$ 1.18	\$ 0.87	\$ 0.70	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.06	\$ 3.1	\$ 0.30	\$ 293
3	4613-2	Mission Hills	2,000	600	50%	1,050	305	20%	1,605	480	1,605	480	\$ 4.3	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.32	\$ 0.05	\$ 0.44	\$ 0.99	\$ 0.34	\$ 0.30	\$ 0.67	\$ 0.28	\$ 0.58	\$ 1.08	\$ 0.83	\$ 0.65	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.05	\$ 3.1	\$ 0.28	\$ 293
4	4614-1	Mission Hills	2,000	600	38%	1,273	382	13%	1,750	525	1,750	525	\$ 5.0	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.3	\$ 5.1	\$ 0.40	\$ 0.08	\$ 0.58	\$ 0.62	\$ 0.33	\$ 0.33	\$ 0.84	\$ 0.30	\$ 0.79	\$ 1.18	\$ 0.90	\$ 0.78	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.07	\$ 3.1	\$ 0.30	\$ 293
5	4615-1	Sky Mountain	2,000	600	27%	1,487	440	8%	1,833	550	1,833	550	\$ 5.4	\$ 3.0	\$ 2.3	\$ 6.8	\$ 6.4	\$ 5.0	\$ 0.44	\$ 0.09	\$ 0.79	\$ 0.64	\$ 0.38	\$ 0.35	\$ 0.88	\$ 0.30	\$ 0.97	\$ 1.18	\$ 0.89	\$ 0.81	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.09	\$ 3.1	\$ 0.30	\$ 293
6	4616-2	Sky Mountain	2,000	600	36%	1,273	382	13%	1,750	525	1,750	525	\$ 5.0	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.3	\$ 5.1	\$ 0.40	\$ 0.08	\$ 0.58	\$ 0.62	\$ 0.33	\$ 0.33	\$ 0.84	\$ 0.30	\$ 0.79	\$ 1.18	\$ 0.89	\$ 0.78	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.07	\$ 3.1	\$ 0.30	\$ 293
7	4617-2	Sky Mountain	2,000	600	49%	1,072	304	20%	1,608	482	1,608	482	\$ 4.4	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.35	\$ 0.06	\$ 0.48	\$ 0.99	\$ 0.34	\$ 0.30	\$ 0.70	\$ 0.28	\$ 0.62	\$ 1.09	\$ 0.83	\$ 0.66	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.06	\$ 3.1	\$ 0.29	\$ 293
8	4620-2	Valley	2,000	600	33%	1,333	400	11%	1,778	503	1,778	503	\$ 4.1	\$ 3.0	\$ 2.1	\$ 6.6	\$ 6.4	\$ 5.2	\$ 0.42	\$ 0.08	\$ 0.60	\$ 0.63	\$ 0.35	\$ 0.34	\$ 0.98	\$ 0.40	\$ 0.98	\$ 1.29	\$ 0.99	\$ 0.80	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.10	\$ 3.1	\$ 0.30	\$ 293
9	4621-1	Valley	1,500	450	52%	721	218	21%	1,181	354	1,181	354	\$ 3.7	\$ 3.0	\$ 1.4	\$ 6.0	\$ 6.4	\$ 3.7	\$ 0.29	\$ 0.04	\$ 0.41	\$ 0.41	\$ 0.24	\$ 0.27	\$ 0.45	\$ 0.28	\$ 0.52	\$ 0.91	\$ 0.73	\$ 0.57	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.04	\$ 3.1	\$ 0.28	\$ 293
10	4622-1	Sky Mountain	1,500	450	44%	833	250	17%	1,250	375	1,250	375	\$ 4.0	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.0	\$ 0.38	\$ 0.14	\$ 0.58	\$ 0.52	\$ 0.30	\$ 0.28	\$ 0.64	\$ 0.25	\$ 1.23	\$ 0.98	\$ 0.79	\$ 0.64	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.14	\$ 3.1	\$ 0.29	\$ 293
11	4631-2	Sky Mountain	2,000	600	48%	1,048	314	19%	1,630	489	1,630	489	\$ 4.5	\$ 3.0	\$ 1.8	\$ 6.2	\$ 6.1	\$ 4.8	\$ 0.36	\$ 0.10	\$ 0.58	\$ 0.61	\$ 0.34	\$ 0.31	\$ 0.71	\$ 0.34	\$ 0.68	\$ 1.10	\$ 0.83	\$ 0.67	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.10	\$ 3.1	\$ 0.30	\$ 293
12	4724-1	Sun City	2,000	600	36%	1,484	435	15%	1,863	529	1,863	529	\$ 5.6	\$ 3.0	\$ 2.4	\$ 6.9	\$ 6.4	\$ 5.1	\$ 0.48	\$ 0.14	\$ 0.90	\$ 0.64	\$ 0.38	\$ 0.34	\$ 0.94	\$ 0.40	\$ 1.09	\$ 1.18	\$ 0.88	\$ 0.80	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.17	\$ 3.1	\$ 0.31	\$ 293
13	4725-1	Sun City	2,000	600	31%	1,385	415	16%	1,800	500	1,800	500	\$ 5.3	\$ 3.0	\$ 2.3	\$ 6.9	\$ 6.4	\$ 5.3	\$ 0.42	\$ 0.20	\$ 1.14	\$ 0.63	\$ 0.38	\$ 0.34	\$ 0.84	\$ 0.33	\$ 1.17	\$ 1.17	\$ 0.87	\$ 0.78	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.20	\$ 3.1	\$ 0.31	\$ 293
14	4727-1	Sun City	2,200	660	29%	1,571	471	8%	2,000	600	2,000	600	\$ 5.7	\$ 3.0	\$ 2.4	\$ 7.2	\$ 6.7	\$ 5.0	\$ 0.46	\$ 0.54	\$ 1.71	\$ 0.67	\$ 0.38	\$ 0.37	\$ 0.96	\$ 0.40	\$ 1.20	\$ 1.29	\$ 0.95	\$ 0.87	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.54	\$ 3.1	\$ 0.31	\$ 293
15	4829-2	Valley	2,000	600	29%	1,500	450	8%	1,848	554	1,848	554	\$ 5.4	\$ 3.0	\$ 2.4	\$ 6.8	\$ 6.4	\$ 5.0	\$ 0.45	\$ 0.09	\$ 1.33	\$ 0.64	\$ 0.38	\$ 0.36	\$ 0.93	\$ 0.34	\$ 1.50	\$ 1.23	\$ 0.92	\$ 0.80	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.23	\$ 3.1	\$ 0.30	\$ 293
16	4829-2 (new)	Valley	2,000	600	29%	1,429	429	9%	1,818	545	1,818	545	\$ 5.4	\$ 3.0	\$ 2.3	\$ 6.7	\$ 6.4	\$ 5.3	\$ 0.43	\$ 0.09	\$ 0.99	\$ 0.64	\$ 0.38	\$ 0.35	\$ 0.96	\$ 0.33	\$ 1.17	\$ 1.17	\$ 0.87	\$ 0.79	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.07	\$ 3.1	\$ 0.31	\$ 293
17	4831-1	Sky Mountain	457	137	45%	711	213	22%	1,188	354	1,188	354	\$ 3.7	\$ 3.0	\$ 1.4	\$ 6.0	\$ 6.4	\$ 3.7	\$ 0.29	\$ 0.04	\$ 0.38	\$ 0.51	\$ 0.30	\$ 0.27	\$ 0.56	\$ 0.30	\$ 0.78	\$ 0.97	\$ 0.79	\$ 0.57	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.04	\$ 3.1	\$ 0.28	\$ 293
18	4864-1	Valley	1,503	451	33%	1,002	301	11%	1,336	401	1,336	401	\$ 4.4	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.35	\$ 0.08	\$ 0.49	\$ 0.54	\$ 0.31	\$ 0.30	\$ 0.74	\$ 0.34	\$ 0.67	\$ 1.01	\$ 0.81	\$ 0.70	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.08	\$ 3.1	\$ 0.30	\$ 293
19	4864-2	Valley	2,000	600	25%	917	284	22%	1,555	450	1,555	450	\$ 4.8	\$ 3.0	\$ 1.9	\$ 6.2	\$ 6.1	\$ 4.8	\$ 0.37	\$ 0.08	\$ 0.44	\$ 0.58	\$ 0.30	\$ 0.29	\$ 0.64	\$ 0.28	\$ 0.68	\$ 1.09	\$ 0.88	\$ 0.64	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.05	\$ 3.1	\$ 0.29	\$ 293
20	4872-2	Sky Mountain	2,000	600	36%	1,273	382	13%	1,750	525	1,750	525	\$ 5.0	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.3	\$ 5.1	\$ 0.41	\$ 0.08	\$ 0.48	\$ 0.62	\$ 0.33	\$ 0.33	\$ 0.85	\$ 0.33	\$ 0.68	\$ 1.18	\$ 0.90	\$ 0.78	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.09	\$ 3.1	\$ 0.30	\$ 293
21	4874-1	Sky Mountain	2,000	600	36%	1,273	382	13%	1,750	525	1,750	525	\$ 5.0	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.3	\$ 5.1	\$ 0.41	\$ 0.08	\$ 0.48	\$ 0.62	\$ 0.33	\$ 0.33	\$ 0.85	\$ 0.33	\$ 0.68	\$ 1.18	\$ 0.90	\$ 0.78	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.09	\$ 3.1	\$ 0.30	\$ 293
22	4874-1	Sky Mountain	2,000	600	36%	1,273	382	13%	1,750	525	1,750	525	\$ 5.0	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.3	\$ 5.1	\$ 0.41	\$ 0.08	\$ 0.48	\$ 0.62	\$ 0.33	\$ 0.33	\$ 0.85	\$ 0.33	\$ 0.68	\$ 1.18	\$ 0.90	\$ 0.78	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.09	\$ 3.1	\$ 0.30	\$ 293
23	4874-1	Valley	2,000	600	22%	1,556	467	7%	1,887	560	1,887	560	\$ 5.7	\$ 3.0	\$ 2.4	\$ 6.8	\$ 6.5	\$ 6.0	\$ 0.46	\$ 0.09	\$ 1.13	\$ 0.65	\$ 0.38	\$ 0.38	\$ 0.95	\$ 0.33	\$ 1.27	\$ 1.24	\$ 0.92	\$ 0.87	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.27	\$ 3.1	\$ 0.31	\$ 293
24	4911-2	La Quinta	2,000	600	48%	1,038	311	19%	1,623	487	1,623	487	\$ 4.4	\$ 3.0	\$ 1.8	\$ 6.2	\$ 6.1	\$ 4.5	\$ 0.35	\$ 0.08	\$ 0.43	\$ 0.49	\$ 0.34	\$ 0.30	\$ 0.70	\$ 0.28	\$ 0.71	\$ 1.09	\$ 0.83	\$ 0.67	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.04	\$ 3.1	\$ 0.28	\$ 293
25	4911-2	La Quinta	2,000	600	33%	1,333	400	11%	1,778	503	1,778	503	\$ 4.1	\$ 3.0	\$ 2.1	\$ 6.6	\$ 6.4	\$ 5.2	\$ 0.42	\$ 0.08	\$ 0.60	\$ 0.63	\$ 0.35	\$ 0.34	\$ 0.98	\$ 0.40	\$ 1.20	\$ 1.29	\$ 0.95	\$ 0.80	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.27	\$ 3.1	\$ 0.30	\$ 293
26	4911-2	La Quinta	2,000	600	48%	1,038	311	19%	1,623	487	1,623	487	\$ 4.4	\$ 3.0	\$ 1.8	\$ 6.2	\$ 6.1	\$ 4.5	\$ 0.35	\$ 0.08	\$ 0.43	\$ 0.49	\$ 0.34	\$ 0.30	\$ 0.70	\$ 0.28	\$ 0.71	\$ 1.09	\$ 0.83	\$ 0.66	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.04	\$ 3.1	\$ 0.28	\$ 293
27	4911-2	La Quinta	2,000	600	52%	861	268	21%	1,274	472	1,274	472	\$ 4.3	\$ 3.0	\$ 1.7	\$ 6.0	\$ 6.1	\$ 4.3	\$ 0.36	\$ 0.04	\$ 0.39	\$ 0.59	\$ 0.33	\$ 0.30	\$ 0.64	\$ 0.28	\$ 0.62	\$ 1.07	\$ 0.82	\$ 0.64	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.04	\$ 3.1	\$ 0.28	\$ 293
28	4911-2	La Quinta	2,000	600	50%	1,050	305	20%	1,605	480	1,605	480	\$ 4.3	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.32	\$ 0.10	\$ 0.46	\$ 0.59	\$ 0.34	\$ 0.30	\$ 0.70	\$ 0.28	\$ 0.62	\$ 1.09	\$ 0.83	\$ 0.65	SBA - CRRF	\$ 3.0	\$ 3.0	\$ 0.10	\$ 3.1	\$ 0.30	\$ 293
29	4911-2	La Quinta	2,000																																		

Scenario 3. Mid-Valley Surface Water Treatment and Individual Wellhead Treatment with CRRF

- * Mid-Valley surface water treatment plant
- * Individual SBA treatment systems at most remaining sites with central regeneration
- * Some clusters where cost effective or operationally advantageous

Assumptions	Value	Cost of Piping (\$/in installed)	\$ 15.83
Proposed MCL (µg/L)	10		
Assume Treatment at 80% of MCL (µg/L)	8		
Bypass Acceptable? (Y/N)	Y	Building Cost (\$/sf)	\$ 268
Finished CRf Gail after Blending (µg/L)	6	Resin	\$ 20
Treated CRf for RCF (µg/L)	5	Years	20
Treated CRf for WBA, SBA and RCMF (µg/L)	2	Resin Volume per SBA Vessel (cu)	\$ 29
Resin Volume per SBA Vessel (cu)	600		

Individual SBA Treatment Systems with Central Regeneration

Count No.	Well ID (Red - Tier 1; Yellow - Tier 2)	Pressure Zone	Well Design Capacity (gpm)	2012 Production Rate (gpm)	SBA, WBA, RCMF			RCF			Treatment Capital Costs (\$M)					Annual O&M Cost (\$M/year)					Annualized Treatment Cost (\$M/yr)					Cost Summary (\$M)										
					Bypass (%)	Treatment Design Capacity (gpm)	Treatment Average Production Rate (gpm)	Bypass for RCF (%)	Treatment Design Capacity for RCF (gpm)	Treatment Average Production Rate for RCF (gpm)	WBA	SBA - CRRF	SBA - single pass	RCF - with recycle	RCF - without recycle	RCMF - without recycle	WBA	SBA - CRRF	SBA - single pass	RCF - with recycle	RCF - without recycle	RCMF - without recycle	WBA	SBA - CRRF	SBA - single pass	RCF - with recycle	RCF - without recycle	RCMF - without recycle	Selected Treatment Technology	Treatment Capital Cost	Total Capital (treatment, pipe, sewer, building and land)	O&M	NPV	Total Annualized Cost (\$M/yr)	Total Water Cost (\$/AF)	
1	4611-1	Skv Mountain	2,200	230	51%	974	112	21%	1,583	182	3	4.3	3.0	1.7	8.1	6.1	4.4	0.27	0.002	0.20	0.42	0.38	0.20	0.62	0.25	0.34	0.51	0.75	0.60	SBA - CRRF	3.0	3.0	0.02	3.2	0.25	85
2	4607-2	Mission Hills	2,200	770	48%	1,152	403	19%	1,793	827	4	4.7	3.0	1.9	8.6	6.4	4.8	0.39	0.07	0.61	0.68	0.38	0.33	0.77	0.31	0.76	0.22	0.89	0.72	SBA - CRRF	3.0	3.0	0.07	3.9	0.31	251
3	4608-1	Mission Hills	2,000	960	56%	1,060	290	26%	1,650	400	3	4.3	3.0	1.8	8.1	6.1	4.4	0.31	0.04	0.38	0.65	0.34	0.29	0.65	0.28	0.50	0.64	0.61	SBA - CRRF	3.0	3.0	0.04	3.5	0.28	347	
4	4610-1	Mission Hills	2,000	267	36%	1,273	267	13%	1,750	368	3	5.0	3.0	2.1	8.5	6.3	4.5	0.38	0.05	0.44	0.53	0.31	0.30	0.62	0.31	0.65	1.09	0.86	0.75	SBA - CRRF	3.0	3.0	0.05	4.1	0.33	483
5	4610-1	Skv Mountain	2,000	140	27%	1,487	101	8%	1,833	128	3	5.4	3.0	2.3	8.8	6.4	4.9	0.37	0.02	0.28	0.39	0.25	0.28	0.81	0.26	0.40	0.95	0.78	0.72	SBA - CRRF	3.0	3.0	0.02	3.2	0.26	1,144
6	4610-1	Skv Mountain	2,000	170	36%	1,273	70	13%	1,750	105	3	5.0	3.0	2.1	8.5	6.3	4.5	0.34	0.01	0.22	0.38	0.25	0.24	0.74	0.25	0.38	0.89	0.78	0.65	SBA - CRRF	3.0	3.0	0.01	3.1	0.25	1,104
7	4611-2	Skv Mountain	2,000	180	49%	1,012	91	29%	1,608	145	3	4.4	3.0	1.8	8.1	6.1	4.4	0.30	0.02	0.21	0.40	0.25	0.24	0.65	0.26	0.35	0.89	0.74	0.60	SBA - CRRF	3.0	3.0	0.02	3.2	0.26	879
8	4608-2	Valley	2,000	550	33%	1,333	367	11%	1,778	493	3	5.1	3.0	2.2	8.6	6.4	4.9	0.41	0.01	0.63	0.60	0.34	0.33	0.95	0.44	0.93	1.28	0.98	0.88	SBA - CRRF	3.0	3.0	0.01	3.5	0.44	899
9	4608-2	Valley	1,500	960	62%	721	260	21%	1,181	441	3	3.7	3.0	1.4	5.9	5.4	3.7	0.27	0.00	0.48	0.56	0.32	0.28	0.56	0.21	0.60	0.96	0.73	0.58	SBA - CRRF	3.0	3.0	0.00	3.7	0.29	325
10	4610-1	Skv Mountain	1,500	280	44%	833	158	17%	1,250	233	3	4.0	3.0	1.8	8.2	5.6	4.0	0.26	0.00	0.69	0.44	0.27	0.25	0.62	0.37	0.86	0.89	0.70	0.62	SBA - CRRF	3.0	3.0	0.00	4.5	0.37	808
11	4610-1	Skv Mountain	2,000	200	48%	1,048	105	18%	1,630	163	3	4.8	3.0	1.8	8.2	6.1	4.4	0.31	0.03	0.30	0.41	0.26	0.25	0.67	0.27	0.40	0.91	0.74	0.61	SBA - CRRF	3.0	3.0	0.03	4.4	0.27	884
12	4720-1	San City	2,000	350	26%	1,484	230	8%	1,840	243	3	5.3	3.0	2.3	8.9	6.4	4.9	0.40	0.05	0.75	0.40	0.30	0.30	0.94	0.51	0.90	1.03	0.91	0.81	SBA - CRRF	3.0	3.0	0.05	4.1	0.33	635
13	4721-1	San City	2,000	370	31%	1,385	298	10%	1,800	333	3	5.3	3.0	2.3	8.7	6.4	5.3	0.39	0.18	1.36	0.51	0.31	0.30	0.81	0.42	1.54	1.05	0.82	0.73	SBA - CRRF	3.0	3.0	0.18	5.2	0.42	697
14	4721-1	San City	2,200	380	29%	1,571	271	9%	2,000	345	3	5.7	3.0	2.3	7.2	6.7	5.8	0.42	0.31	4.44	0.53	0.31	0.31	0.92	0.58	4.68	1.14	0.88	0.81	SBA - CRRF	3.0	3.0	0.31	7.3	0.59	968
17	4608-1	Skv Mountain	1,523	870	53%	711	408	22%	1,185	677	3	4.7	3.0	1.4	5.0	5.4	3.7	0.30	0.07	0.61	0.69	0.38	0.32	0.59	0.31	0.72	1.10	0.81	0.62	SBA - CRRF	3.0	3.0	0.07	3.8	0.31	220
20	4608-2	Skv Mountain	2,000	1,000	36%	1,273	638	13%	1,750	875	3	5.0	3.0	2.1	8.5	6.3	4.5	0.47	0.08	0.71	0.82	0.44	0.46	0.91	0.36	0.82	1.39	0.99	0.86	SBA - CRRF	3.0	3.0	0.08	4.9	0.38	225
21	4610-1	Skv Mountain	2,000	1,020	36%	1,273	663	13%	1,750	893	3	5.0	3.0	2.1	8.5	6.3	4.5	0.46	0.10	0.81	0.84	0.44	0.41	0.90	0.38	1.02	1.46	0.99	0.86	SBA - CRRF	3.0	3.0	0.10	4.7	0.38	231
22	4610-1	Skv Mountain	2,000	1,180	31%	1,385	824	10%	1,800	1,071	3	5.3	3.0	2.3	8.7	6.4	5.3	0.51	0.18	1.19	0.94	0.49	0.48	0.93	0.39	1.37	1.48	1.00	0.89	SBA - CRRF	3.0	3.0	0.18	4.9	0.39	205
23	4610-1	La Quinta	2,000	790	49%	1,098	409	18%	1,623	84	3	4.4	3.0	1.8	8.2	6.1	4.4	0.31	0.08	0.52	0.69	0.38	0.33	0.72	0.30	0.60	1.18	0.87	0.69	SBA - CRRF	3.0	3.0	0.08	4.7	0.38	292
25	4711-2	La Quinta	2,000	1,980	33%	1,333	827	11%	1,778	1,236	3	5.1	3.0	2.3	8.6	6.4	4.9	0.52	0.75	5.42	1.04	0.53	0.48	0.97	1.02	5.63	1.61	1.08	0.95	SBA - CRRF	3.0	3.0	0.75	12.8	1.02	587
26	4711-1	La Quinta	2,000	280	49%	1,012	142	20%	1,609	229	3	4.4	3.0	1.8	8.1	6.1	4.4	0.31	0.02	0.27	0.44	0.27	0.25	0.68	0.26	0.41	0.94	0.76	0.61	SBA - CRRF	3.0	3.0	0.02	3.3	0.26	353
27	4711-1	La Quinta	2,000	290	62%	981	98	21%	1,574	157	3	4.3	3.0	1.7	8.0	6.1	4.3	0.27	0.01	0.21	0.40	0.28	0.24	0.61	0.25	0.30	0.89	0.74	0.58	SBA - CRRF	3.0	3.0	0.01	3.1	0.25	778
28	4711-1	La Quinta	2,000	150	59%	1,000	75	29%	1,600	120	3	4.8	3.0	1.8	8.1	6.1	4.4	0.27	0.02	0.29	0.38	0.25	0.24	0.61	0.26	0.43	0.87	0.74	0.59	SBA - CRRF	3.0	3.0	0.02	3.3	0.28	1,088
29	4711-1	La Quinta	2,000	180	46%	1,111	160	17%	1,667	160	3	4.8	3.0	1.9	8.3	6.2	4.4	0.32	0.01	0.19	0.40	0.28	0.25	0.69	0.25	0.39	0.91	0.75	0.62	SBA - CRRF	3.0	3.0	0.01	3.1	0.25	910
30	4717-1	La Quinta	2,000	400	49%	1,200	90	14%	1,714	129	3	4.8	3.0	2.0	8.4	6.3	4.5	0.33	0.01	0.21	0.38	0.25	0.25	0.75	0.41	0.85	0.81	0.68	SBA - CRRF	3.0	3.0	0.01	3.6	0.29	1,004	
31	4718-1	La Quinta	2,000	140	31%	1,385	97	10%	1,800	126	3	5.3	3.0	2.3	8.7	6.4	5.3	0.36	0.01	0.20	0.39	0.25	0.20	0.82	0.29	0.42	0.97	0.81	0.72	SBA - CRRF	3.0	3.0	0.01	3.7	0.29	1,298
32	4720-1	San City	2,200	430	22%	1,711	334	7%	2,050	401	3	6.0	3.0	2.3	7.4	6.7	6.1	0.45	0.07	1.08	0.58	0.33	0.33	0.93	0.31	1.29	1.15	0.87	0.82	SBA - CRRF	3.0	3.0	0.07	4.8	0.31	641
33	4720-1	San City	2,000	260	33%	1,333	113	17%	1,778	231	3	5.1	3.0	2.3	8.6	6.4	5.2	0.37	0.04	0.41	0.45	0.28	0.27	0.78	0.28	0.58	0.98	0.79	0.69	SBA - CRRF	3.0	3.0	0.04	3.5	0.28	674
34	4721-1	La Quinta	2,000	1,400	48%	1,036	725	19%	1,623	1,136	3	4.4	3.0	1.8	8.2	6.1	4.4	0.42	0.12	0.96	0.97	0.50	0.42	0.78	0.36	1.10	1.47	0.98	0.78	SBA - CRRF	3.0	3.0	0.12	4.5	0.36	159
35	4721-1	La Quinta	2,000	830	44%	1,111	461	11%	1,667	692	3	4.8	3.0	1.9	8.3	6.2	4.4	0.38	0.06	0.30	0.72	0.39	0.35	0.76	0.30	0.60	1.22	0.89	0.73	SBA - CRRF	3.0	3.0	0.06	3.7	0.30	224
36	4701-1	La Quinta	1,500	1,000	33%	1,333	667	11%	1,778	889	3	4.3	3.0	1.8	8.4	5.7	4.4	0.36	0.20	1.92	0.62	0.43	0.49	0.75	0.53	2.10	1.30	0.93	0.80	SBA - CRRF	3.0	3.0	0.20	4.7	0.33	332
37	4701-1	La Quinta	2,000	1,050	33%	1,333	1,000	11%	1,778</																											

Scenario 4. East Valley Surface Water Treatment and Individual Wellhead Treatment with CRRF

- * East Valley surface water treatment plant
- * Individual SBA treatment systems at most remaining sites with central regeneration
- * Some clusters where cost effective or operationally advantageous

Assumptions			
Resuspended MCL (µg/L)	10		
Resuspension Treatment at 80% of MCL (µg/L)	8	Cost of Piping (\$/ft/in installed)	\$ 15.83
Bypass Acceptable? (Y/N)	Y	Building Cost (\$/sf)	\$ 268
Finished CRI Cost after Blending (µg/L)	5	Rate	\$/M
Treated CRI for RCF (µg/L)	5	Years	20
Treated CRI for WBA, SBA and RCMP (µg/L)	2	Resin regen cost (\$/ct)	\$ 29
Resin Volume per SBA Vessel (ct)	600		

Individual SBA Treatment Systems with Central Regeneration

Count No.	Well ID (Red - Tier 1; Yellow - Tier 2)	Pressure Zone	Well Design Capacity (gpm)	2012 Production Rate (gpm)	SBA, WBA, RCMP			RCF			Treatment Capital Costs (\$M)					Annual O&M Cost (\$/year)					Annualized Treatment Cost (\$/Myr)					Cost Summary (\$M)												
					Bypass (%)	Treatment Design Capacity (gpm)	Treatment Average Production Rate (gpm)	Bypass for RCF (%)	Treatment Design Capacity for RCF (gpm)	Treatment Average Production Rate for RCF (gpm)	WBA	SBA-CRRF	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMP-without recycle	WBA	SBA-CRRF	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMP-without recycle	WBA	SBA-CRRF	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMP-without recycle	Selected Treatment Technology	Treatment Capital Cost	Total Capital (treatment, pipe, sewer, building and land)	O&M	NPV	Total Annualized Cost (\$/Myr)	Total Water Cost (\$/AF)			
1	4511-1	Skv Mountain	2,000	230	51%	974	112	21%	1,583	182	3	4.3	3.0	1.7	8.1	6.1	6.4	4.4	0.927	0.002	0.200	0.422	0.326	0.220	0.622	0.231	0.334	0.031	0.775	0.600	SBA-CRRF	3.0	3.0	0.02	3.2	0.25	3	685
2	4507-2	Mission Hills	2,000	770	48%	1,152	403	19%	1,793	827	4	3.0	3.0	1.8	6.6	6.4	4.8	4.4	0.39	0.07	0.61	0.68	0.38	0.33	0.771	0.81	0.70	0.122	0.89	0.72	SBA-CRRF	3.0	3.0	0.07	3.9	0.41	3	251
3	4510-1	Mission Hills	2,000	500	56%	1,000	250	26%	1,600	400	4	3.0	3.0	1.8	6.1	6.1	4.4	4.4	0.31	0.001	0.38	0.253	0.34	0.229	0.625	0.263	0.252	1.04	0.81	SBA-CRRF	3.0	3.0	0.06	3.6	0.28	3	347	
4	4510-1	Mission Hills	2,000	450	36%	974	264	13%	1,750	365	5	6.0	3.0	2.1	6.5	6.1	5.1	3.80	0.053	0.041	0.53	0.31	0.30	0.951	0.351	0.051	1.09	0.84	SBA-CRRF	3.0	3.0	0.05	3.1	0.33	3	483		
5	4610-1	Skv Mountain	2,000	140	27%	1,487	161	8%	1,833	128	6	3.4	3.0	2.3	6.8	6.4	5.4	5.4	0.37	0.022	0.28	0.39	0.29	0.208	0.81	0.26	0.448	0.995	0.78	SBA-CRRF	3.0	3.0	0.02	3.2	0.26	3	1,154	
6	4610-1	Skv Mountain	2,000	120	36%	1,273	70	13%	1,750	105	5	6.0	3.0	2.1	6.8	6.3	6.1	5.34	0.011	0.021	0.38	0.29	0.24	0.74	0.25	0.38	0.80	0.78	SBA-CRRF	3.0	3.0	0.01	3.1	0.25	3	1,094		
7	4611-2	Skv Mountain	2,000	180	49%	1,012	91	29%	1,608	145	4	4.4	3.0	1.8	6.1	6.1	4.4	4.4	0.30	0.002	0.21	0.40	0.25	0.24	0.655	0.26	0.35	0.89	0.74	SBA-CRRF	3.0	3.0	0.03	3.2	0.26	3	479	
8	4628-2	Valley	2,000	550	33%	1,333	367	11%	1,778	489	5	3.7	3.0	2.3	6.6	6.4	5.2	5.2	0.41	0.001	0.63	0.60	0.34	0.33	0.995	0.44	0.93	1.28	0.98	SBA-CRRF	3.0	3.0	0.08	3.9	0.44	3	899	
9	4629-1	Valley	1,500	560	52%	721	269	21%	1,181	441	3	3.7	3.0	1.4	5.9	5.4	5.1	3.7	0.27	0.001	0.48	0.56	0.52	0.28	0.56	0.21	0.60	0.96	0.73	SBA-CRRF	3.0	3.0	0.06	3.7	0.29	3	325	
10	4630-1	Skv Mountain	1,500	280	44%	833	150	17%	1,250	233	4	4.0	3.0	1.8	5.2	5.0	4.0	4.0	0.26	0.001	0.69	0.44	0.27	0.25	0.62	0.37	0.88	0.89	SBA-CRRF	3.0	3.0	0.07	4.5	0.37	3	808		
11	4631-1	Skv Mountain	2,000	200	45%	1,048	105	16%	1,650	163	4	4.8	3.0	1.8	6.2	6.1	6.1	4.3	0.31	0.001	0.35	0.41	0.26	0.25	0.67	0.27	0.50	0.91	0.73	SBA-CRRF	3.0	3.0	0.01	3.4	0.27	3	841	
12	4720-1	San City	2,000	320	26%	1,484	237	8%	1,840	294	5	3.5	3.0	2.3	6.8	6.3	5.8	5.0	0.09	0.75	0.49	0.30	0.30	0.84	0.33	0.94	1.03	0.81	SBA-CRRF	3.0	3.0	0.09	4.1	0.33	3	635		
13	4721-1	San City	2,000	370	31%	1,385	298	10%	1,800	333	5	3.6	3.0	2.2	6.7	6.4	5.3	5.3	0.39	0.18	1.36	0.51	0.31	0.30	0.81	0.42	1.54	1.05	0.82	SBA-CRRF	3.0	3.0	0.18	5.2	0.42	3	687	
14	4722-1	San City	2,000	380	29%	1,671	273	2%	2,000	345	5	3.7	3.0	2.3	7.2	6.7	6.8	6.42	0.31	0.44	0.53	0.31	0.31	0.92	0.56	1.48	1.14	0.88	0.81	SBA-CRRF	3.0	3.0	0.15	7.3	0.69	3	968	
15	4802-2	Valley	2,000	920	25%	1,500	690	8%	1,846	848	5	5.8	3.0	2.4	6.8	6.8	6.5	5.6	0.50	0.13	1.97	0.81	0.44	0.43	0.98	0.41	2.20	1.40	0.99	SBA-CRRF	3.0	3.0	0.13	6.1	0.41	3	276	
16	4802-2 (new)	Valley	2,000	1,000	29%	1,429	714	9%	1,818	899	5	6.4	3.0	2.3	6.7	6.4	5.8	5.8	0.48	0.19	0.92	0.80	0.46	0.43	0.91	0.38	1.11	1.39	0.98	SBA-CRRF	3.0	3.0	0.12	6.4	0.38	3	221	
17	4803-1	Skv Mountain	1,500	870	58%	711	461	22%	1,185	477	3	3.7	3.0	1.4	5.0	5.4	5.1	3.0	0.07	0.55	0.61	0.68	0.38	0.30	0.99	0.31	0.70	1.00	0.81	SBA-CRRF	3.0	3.0	0.07	3.8	0.31	3	220	
18	4804-1	Valley	1,500	446	33%	1,002	291	11%	1,338	381	3	4.4	3.0	1.8	5.4	5.7	4.4	4.4	0.34	0.001	0.48	0.53	0.31	0.30	0.73	0.33	0.87	1.01	0.80	SBA-CRRF	3.0	3.0	0.08	4.2	0.33	3	471	
19	4804-1	Valley	2,000	110	63%	947	528	22%	1,568	888	4	4.2	3.0	1.7	6.8	6.1	4.3	4.3	0.36	0.001	0.73	0.62	0.43	0.38	0.78	0.33	0.81	1.38	0.93	SBA-CRRF	3.0	3.0	0.03	4.4	0.33	3	164	
20	4806-2	Skv Mountain	2,000	1,000	36%	1,273	638	13%	1,750	875	5	5.0	3.0	2.1	6.8	6.3	6.1	4.7	0.08	0.71	0.83	0.44	0.40	0.91	0.38	0.50	1.39	0.89	SBA-CRRF	3.0	3.0	0.06	4.6	0.38	3	225		
21	4907-1	Skv Mountain	2,000	1,020	36%	1,273	649	13%	1,750	883	5	5.0	3.0	2.1	6.5	6.3	5.1	5.46	0.10	0.81	0.84	0.44	0.41	0.90	0.38	1.02	1.40	0.98	SBA-CRRF	3.0	3.0	0.06	4.7	0.38	3	231		
22	4907-1	Skv Mountain	2,000	1,150	31%	1,385	824	10%	1,800	1,071	5	5.3	3.0	2.3	6.7	6.4	5.3	5.51	0.16	1.01	0.84	0.49	0.46	0.93	0.38	1.31	1.48	1.00	SBA-CRRF	3.0	3.0	0.15	4.9	0.39	3	265		
23	4909-1	Valley	2,000	1,130	22%	1,568	879	7%	1,887	1,055	5	5.7	3.0	2.4	6.8	6.8	5.8	5.8	0.54	0.13	2.02	0.93	0.49	0.48	1.04	0.41	2.25	1.52	1.05	SBA-CRRF	3.0	3.0	0.13	6.1	0.41	3	226	
24	4911-1	La Quinta	2,000	790	46%	1,086	468	19%	1,622	641	4	4.4	3.0	1.8	6.2	6.1	4.5	4.5	0.37	0.001	0.52	0.68	0.38	0.33	0.72	0.30	0.60	1.18	0.87	SBA-CRRF	3.0	3.0	0.06	3.7	0.30	3	232	
25	4911-1	La Quinta	2,000	200	52%	961	90	21%	1,574	171	4	4.3	3.0	1.7	6.0	6.1	4.3	4.3	0.27	0.01	0.21	0.40	0.26	0.24	0.61	0.25	0.35	0.89	0.74	SBA-CRRF	3.0	3.0	0.07	3.1	0.25	3	778	
26	4911-1	La Quinta	2,000	150	50%	1,000	70	29%	1,600	120	5	4.3	3.0	1.8	6.1	6.1	4.4	4.4	0.27	0.002	0.29	0.38	0.25	0.24	0.61	0.26	0.43	0.87	0.74	SBA-CRRF	3.0	3.0	0.02	3.3	0.26	3	1,084	
27	4914-1	San City	2,000	430	22%	1,211	334	7%	2,050	481	5	6.0	3.0	2.5	7.4	6.7	6.1	4.45	0.07	1.08	0.64	0.33	0.33	0.93	0.31	1.20	1.15	0.87	SBA-CRRF	3.0	3.0	0.07	3.8	0.31	3	441		
28	4920-1	San City	2,000	260	33%	1,333	171	11%	1,778	231	5	4.3	3.0	2.3	6.6	6.4	5.2	5.2	0.07	0.04	0.61	0.45	0.28	0.27	0.78	0.28	0.58	0.98	0.79	SBA-CRRF	3.0	3.0	0.05	3.5	0.28	3	1,078	
29	4928-1	Cahuilla	2,000	1,020	27%	1,613	748	8%	2,017	895	6	3.8	3.0	2.3	7.3	6.7	5.8	5.50	0.12	1.70	0.87	0.46	0.45	1.01	0.40	2.01	1.49	1.04	SBA-CRRF	3.0	3.0	0.12	4.9	0.40	3	241		
30	4909-1	Middleton Road	2,000	110	19%	1,791	90	6%	2,081	104	5	6.2	3.0	2.7	7.4	6.8	6.3	4.42	0.06	0.91	0.29	0.29	0.20	0.91	0.32	0.80	0.99	0.81	SBA-CRRF	3.0	3.0	0.01	3.4	0.27	3	1,531		
31	4907-1	Mecca	1,800	760	60%	727	308	27%	1,317	555	3	3.7	3.0	1.4	5.4	5.6	3.8	3.8	0.27	0.001	0.70	0.63	0.35	0.29	0.56	0.32	0.80	0.80	SBA-CRRF	3.0	3.0	0.08	4.0					

Scenario 5. Point of Use Program

* POU devices at residential, commercial, and public locations

	All Residential	All Commercial and Public Agency	Total
Initial Capital Costs			
Program Administration (Initial Cost over 5 years)	\$5,697,877	\$584,071	\$6,281,948
Training (Initial Cost)	\$933,334	\$192,186	\$1,125,520
Installation Costs (over 4 years)			
RO Systems (units and flow meters)	\$100,498,904	\$18,518,236	\$119,017,140
Installation (vehicles, equipment, sink repair, continued training and inspections)	\$11,128,104	\$2,151,534	\$13,279,638
Labor	\$21,386,071	\$3,940,663	\$25,326,734
Post Installation Water Sampling and Lab Analysis	\$6,912,305	\$1,273,683	\$8,185,988
Procurement and Contingency	\$55,970,153	\$12,942,058	\$68,912,211
<i>Capital Subtotal</i>	\$202,526,747	\$39,602,431	\$242,129,178
Operations and Maintenance (annual)			
Labor (Technicians, Administrators, and Customer Service Assistants)	\$4,853,499	\$948,417	\$5,801,916
Transportation	\$1,081,926	\$199,359	\$1,281,285
Lab Analysis	\$6,912,305	\$1,273,683	\$8,185,988
Filter and Meter Replacement (Materials)	\$23,192,844	\$3,344,801	\$26,537,645
Disposal	\$3,245	\$1,622	\$4,867
Contingency	\$10,813,146	\$2,307,153	\$13,120,298
<i>O&M Subtotal</i>	\$46,856,964	\$8,075,035	\$54,931,999
Annualized Initial Capital Costs	\$16,251,270	\$3,177,801	\$19,429,072
Total Annualized Cost	\$63,108,234	\$11,252,837	\$74,361,071
Monthly Cost to Customers	\$44	\$42	\$44

Scenario 6. Mid-Valley and East Valley Surface Water Treatment and Individual Wellhead Treatment with CRRF

- * Mid Valley and East Valley surface water treatment plants
- * Individual SBA treatment systems at most sites with central regeneration
- * Some clusters where cost effective or operationally advantageous

Assumptions			
Resuspended MCL (µg/L)	10		
Resuspension Treatment at 80% of MCL (µg/L)	8	Cost of Piping (\$/ft/in installed)	\$ 15.83
Bypass Acceptable? (Y/N)	y	Building Cost (\$/sf)	\$ 268
Finished CIG Cost after Blending (µg/L)	6	Rate	\$
Treated CIG for RCF (µg/L)	5	Years	20
Treated CIG for WBA, SBA and RCMF (µg/L)	2	Resin regen cost (\$/ct)	\$ 29
Resin Volume per SBA Vessel (ct)	600		

Individual SBA Treatment Systems with Central Regeneration

Count No.	Well ID (Red - Tier 1; Yellow - Tier 2)	Pressure Zone	Well Design Capacity (gpm)	2012 Production Rate (gpm)	SBA, WBA, RCMF			RCF			Treatment Capital Costs (\$M)						Annual O&M Cost (\$M/year)						Annualized Treatment Cost (\$M/yr)						Cost Summary (\$M)						
					Bypass (%)	Treatment Design Capacity (gpm)	Treatment Average Production Rate (gpm)	Bypass for RCF (%)	Treatment Design Capacity for RCF (gpm)	Treatment Average Production Rate for RCF (gpm)	WBA	SBA-CRRF	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMF-without recycle	WBA	SBA-CRRF	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMF-without recycle	WBA	SBA-CRRF	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMF-without recycle	Selected Treatment Technology	Treatment Capital Cost	Total Capital Cost (treatment, pipe, sewer, building and land)	O&M	NPV	Total Annualized Cost (\$M/yr)	Total Water Cost (\$/AF)
1	4511-1	Skv Mountain	2,200	230	51%	974	112	21%	1,583	182	\$ 4.3	\$ 3.0	\$ 1.7	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.27	\$ 0.02	\$ 0.20	\$ 0.42	\$ 0.26	\$ 0.22	\$ 0.62	\$ 0.25	\$ 0.34	\$ 0.91	\$ 0.75	\$ 0.60	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.02	\$ 3.2	\$ 0.25	\$ 685
2	4507-2	Mission Hills	2,200	770	48%	1,152	403	18%	1,793	827	\$ 4.7	\$ 3.0	\$ 1.8	\$ 6.6	\$ 6.4	\$ 4.8	\$ 0.39	\$ 0.07	\$ 0.61	\$ 0.68	\$ 0.38	\$ 0.33	\$ 0.77	\$ 0.31	\$ 0.76	\$ 1.22	\$ 0.89	\$ 0.72	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.07	\$ 3.9	\$ 0.41	\$ 261
3	4504-1	Mission Hills	2,000	500	56%	1,000	250	20%	1,600	400	\$ 4.3	\$ 3.0	\$ 1.6	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.31	\$ 0.04	\$ 0.36	\$ 0.25	\$ 0.34	\$ 0.23	\$ 0.65	\$ 0.28	\$ 0.52	\$ 1.04	\$ 0.81	\$ 0.64	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.04	\$ 3.5	\$ 0.28	\$ 347
4	4510-1	Mission Hills	2,000	450	56%	1,000	260	19%	1,750	365	\$ 6.0	\$ 3.0	\$ 2.1	\$ 6.5	\$ 6.3	\$ 5.1	\$ 0.30	\$ 0.05	\$ 0.44	\$ 0.53	\$ 0.31	\$ 0.30	\$ 0.95	\$ 0.35	\$ 0.65	\$ 1.09	\$ 0.86	\$ 0.75	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.05	\$ 3.1	\$ 0.51	\$ 483
5	4610-1	Skv Mountain	2,000	140	27%	1,487	160	8%	1,833	128	\$ 6.4	\$ 3.0	\$ 2.3	\$ 6.8	\$ 6.4	\$ 5.4	\$ 0.37	\$ 0.02	\$ 0.28	\$ 0.39	\$ 0.25	\$ 0.26	\$ 0.81	\$ 0.26	\$ 0.46	\$ 0.95	\$ 0.78	\$ 0.72	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.02	\$ 3.2	\$ 0.26	\$ 1,154
6	4611-1	Skv Mountain	2,000	120	36%	1,273	70	13%	1,750	105	\$ 6.0	\$ 3.0	\$ 2.1	\$ 6.8	\$ 6.3	\$ 5.1	\$ 0.34	\$ 0.01	\$ 0.22	\$ 0.38	\$ 0.25	\$ 0.24	\$ 0.74	\$ 0.25	\$ 0.38	\$ 0.80	\$ 0.78	\$ 0.65	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.01	\$ 3.1	\$ 0.25	\$ 1,094
7	4611-2	Skv Mountain	2,000	180	49%	1,012	61	29%	1,608	145	\$ 4.4	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.30	\$ 0.02	\$ 0.21	\$ 0.40	\$ 0.25	\$ 0.24	\$ 0.65	\$ 0.26	\$ 0.35	\$ 0.89	\$ 0.74	\$ 0.60	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.00	\$ 3.2	\$ 0.26	\$ 879
8	4626-2	Valley	2,000	550	33%	1,333	367	11%	1,778	489	\$ 6.7	\$ 3.0	\$ 2.3	\$ 6.6	\$ 6.4	\$ 5.2	\$ 0.41	\$ 0.08	\$ 0.63	\$ 0.60	\$ 0.34	\$ 0.33	\$ 0.95	\$ 0.44	\$ 0.93	\$ 1.26	\$ 0.98	\$ 0.88	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.08	\$ 3.5	\$ 0.44	\$ 499
9	4627-1	Valley	1,500	560	52%	721	269	21%	1,181	441	\$ 3.7	\$ 3.0	\$ 1.6	\$ 5.9	\$ 5.4	\$ 3.7	\$ 0.27	\$ 0.06	\$ 0.48	\$ 0.56	\$ 0.32	\$ 0.28	\$ 0.56	\$ 0.21	\$ 0.60	\$ 0.96	\$ 0.73	\$ 0.58	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.06	\$ 3.7	\$ 0.21	\$ 325
10	4630-1	Skv Mountain	1,500	280	44%	833	156	17%	1,250	233	\$ 4.0	\$ 3.0	\$ 1.8	\$ 5.2	\$ 5.0	\$ 4.0	\$ 0.26	\$ 0.09	\$ 0.69	\$ 0.44	\$ 0.27	\$ 0.25	\$ 0.62	\$ 0.37	\$ 0.80	\$ 0.89	\$ 0.75	\$ 0.62	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.09	\$ 3.5	\$ 0.37	\$ 808
11	4630-2	Skv Mountain	2,000	200	45%	1,048	105	18%	1,650	163	\$ 4.5	\$ 3.0	\$ 1.8	\$ 6.2	\$ 6.1	\$ 4.3	\$ 0.31	\$ 0.03	\$ 0.35	\$ 0.41	\$ 0.26	\$ 0.25	\$ 0.67	\$ 0.27	\$ 0.50	\$ 0.91	\$ 0.78	\$ 0.61	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.03	\$ 3.4	\$ 0.27	\$ 841
12	4720-1	San City	2,000	320	26%	1,484	237	8%	1,840	294	\$ 5.5	\$ 3.0	\$ 2.3	\$ 6.8	\$ 6.3	\$ 5.0	\$ 0.40	\$ 0.09	\$ 0.75	\$ 0.49	\$ 0.30	\$ 0.30	\$ 0.84	\$ 0.53	\$ 0.94	\$ 1.03	\$ 0.81	\$ 0.74	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.09	\$ 4.1	\$ 0.33	\$ 635
13	4721-1	San City	2,000	370	31%	1,385	298	10%	1,800	333	\$ 6.3	\$ 3.0	\$ 2.2	\$ 6.7	\$ 6.4	\$ 5.3	\$ 0.39	\$ 0.18	\$ 1.36	\$ 0.51	\$ 0.31	\$ 0.30	\$ 0.81	\$ 0.42	\$ 1.54	\$ 1.05	\$ 0.82	\$ 0.73	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.18	\$ 5.2	\$ 0.42	\$ 697
14	4722-1	San City	2,200	380	29%	1,571	273	9%	2,000	345	\$ 5.7	\$ 3.0	\$ 2.5	\$ 7.2	\$ 6.7	\$ 5.8	\$ 0.42	\$ 0.31	\$ 4.84	\$ 0.53	\$ 0.31	\$ 0.31	\$ 0.92	\$ 0.56	\$ 1.48	\$ 1.14	\$ 0.89	\$ 0.81	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.31	\$ 7.3	\$ 0.59	\$ 968
15	4608-1	Skv Mountain	1,523	870	53%	711	408	22%	1,185	677	\$ 7.3	\$ 3.0	\$ 1.4	\$ 5.0	\$ 5.4	\$ 3.7	\$ 0.36	\$ 0.07	\$ 0.61	\$ 0.69	\$ 0.38	\$ 0.32	\$ 0.59	\$ 0.31	\$ 0.72	\$ 1.10	\$ 0.81	\$ 0.62	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.07	\$ 3.8	\$ 0.31	\$ 220
16	4612-1	Skv Mountain	2,000	1,000	36%	1,273	636	13%	1,750	876	\$ 6.0	\$ 3.0	\$ 2.1	\$ 6.5	\$ 6.3	\$ 5.1	\$ 0.47	\$ 0.08	\$ 0.71	\$ 0.83	\$ 0.44	\$ 0.46	\$ 0.91	\$ 0.36	\$ 0.90	\$ 1.39	\$ 0.99	\$ 0.86	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.08	\$ 4.5	\$ 0.36	\$ 225
17	4617-1	Skv Mountain	2,000	1,020	38%	1,273	663	13%	1,750	883	\$ 6.0	\$ 3.0	\$ 2.1	\$ 6.5	\$ 6.3	\$ 5.1	\$ 0.46	\$ 0.10	\$ 0.81	\$ 0.84	\$ 0.44	\$ 0.41	\$ 0.90	\$ 0.36	\$ 1.00	\$ 1.40	\$ 0.99	\$ 0.86	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.10	\$ 4.7	\$ 0.38	\$ 231
18	4678-1	Skv Mountain	2,000	1,196	31%	1,385	824	10%	1,800	1,071	\$ 6.3	\$ 3.0	\$ 2.3	\$ 6.7	\$ 6.4	\$ 5.3	\$ 0.51	\$ 0.18	\$ 1.19	\$ 0.94	\$ 0.49	\$ 0.48	\$ 0.93	\$ 0.39	\$ 1.37	\$ 1.48	\$ 1.00	\$ 0.89	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.18	\$ 4.9	\$ 0.39	\$ 205
19	4712-1	La Quinta	2,000	790	48%	1,098	409	18%	1,623	641	\$ 4.4	\$ 3.0	\$ 1.8	\$ 6.2	\$ 6.1	\$ 4.3	\$ 0.37	\$ 0.08	\$ 0.53	\$ 0.69	\$ 0.38	\$ 0.33	\$ 0.72	\$ 0.30	\$ 0.61	\$ 1.18	\$ 0.87	\$ 0.69	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.08	\$ 3.7	\$ 0.38	\$ 292
20	4711-1	La Quinta	2,000	200	52%	961	98	23%	1,574	157	\$ 4.3	\$ 3.0	\$ 1.8	\$ 6.0	\$ 6.1	\$ 4.3	\$ 0.27	\$ 0.01	\$ 0.21	\$ 0.40	\$ 0.26	\$ 0.24	\$ 0.61	\$ 0.25	\$ 0.36	\$ 0.89	\$ 0.74	\$ 0.59	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.01	\$ 3.1	\$ 0.25	\$ 778
21	4715-1	La Quinta	2,000	150	50%	1,000	175	20%	1,600	120	\$ 4.3	\$ 3.0	\$ 1.8	\$ 6.1	\$ 6.1	\$ 4.4	\$ 0.27	\$ 0.02	\$ 0.26	\$ 0.38	\$ 0.25	\$ 0.24	\$ 0.61	\$ 0.26	\$ 0.41	\$ 0.87	\$ 0.74	\$ 0.59	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.02	\$ 3.3	\$ 0.26	\$ 1,086
22	4718-1	San City	2,200	430	25%	1,711	334	7%	2,053	401	\$ 6.0	\$ 3.0	\$ 2.6	\$ 7.4	\$ 6.7	\$ 6.1	\$ 0.45	\$ 0.07	\$ 1.08	\$ 0.56	\$ 0.33	\$ 0.33	\$ 0.93	\$ 0.31	\$ 1.20	\$ 1.15	\$ 0.87	\$ 0.82	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.07	\$ 3.8	\$ 0.11	\$ 441
23	4720-1	San City	2,000	260	33%	1,333	173	11%	1,778	231	\$ 5.1	\$ 3.0	\$ 2.2	\$ 6.6	\$ 6.4	\$ 5.2	\$ 0.37	\$ 0.04	\$ 0.41	\$ 0.45	\$ 0.28	\$ 0.27	\$ 0.78	\$ 0.28	\$ 0.58	\$ 0.98	\$ 0.79	\$ 0.69	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.04	\$ 3.5	\$ 0.28	\$ 674
24	4728-1	Cahuilla	2,200	1,000	27%	1,613	748	8%	2,017	800	\$ 6.8	\$ 3.0	\$ 2.5	\$ 7.3	\$ 6.7	\$ 5.3	\$ 0.50	\$ 0.12	\$ 1.70	\$ 0.87	\$ 0.46	\$ 0.45	\$ 1.01	\$ 0.40	\$ 2.03	\$ 1.48	\$ 1.04	\$ 0.96	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.12	\$ 4.9	\$ 0.40	\$ 241
25	4805-1	Madison Road	2,200	110	19%	1,791	80	5%	2,081	108	\$ 6.2	\$ 3.0	\$ 2.1	\$ 7.4	\$ 6.8	\$ 6.3	\$ 0.42	\$ 0.05	\$ 0.60	\$ 0.58	\$ 0.25	\$ 0.26	\$ 0.91	\$ 0.27	\$ 0.80	\$ 0.99	\$ 0.81	\$ 0.78	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.05	\$ 3.4	\$ 0.27	\$ 1,531
26	4807-1	Mecca	1,800	760	60%	727	308	27%	1,317	555	\$ 3.7	\$ 3.0	\$ 1.4	\$ 5.4	\$ 5.8	\$ 3.8	\$ 0.27	\$ 0.08	\$ 0.70	\$ 0.63	\$ 0.35	\$ 0.29	\$ 0.56	\$ 0.32	\$ 0.82	\$ 1.08	\$ 0.80	\$ 0.60	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.08	\$ 4.0	\$ 0.32	\$ 262
27	4808-1	Madison Road	2,200	130	27%	1,613	80	8%	2,017	118	\$ 5.8	\$ 3.0	\$ 2.5	\$ 7.3	\$ 6.7	\$ 5.3	\$ 0.39	\$ 0.02	\$ 0.36	\$ 0.38	\$ 0.26	\$ 0.23	\$ 0.86	\$ 0.21	\$ 0.54	\$ 0.98	\$ 0.80	\$ 0.74	SBA-CRRF	\$ 3.0	\$ 3.0	\$ 0.02	\$ 3.2	\$ 0.23	\$ 1,213

Clustered Treatment WBA or Blending

Group	Grouped Wells (Red - Tier 1; Yellow - Tier 2; Blue - Blending wells)	Pressure Zone	Design Capacity (gpm)	2012 Production Rate (gpm)	SBA, WBA and RCMF			RCF			Treatment Capital Costs (\$M)						Annual O&M Cost (\$M/year)						Annualized Treatment Cost (\$M/yr)						Cost Summary (\$M)						
					Bypass for WBA, SBA and RCMF (%)	Treatment Design Capacity (gpm)	Treatment Average Production Rate for WBA, SBA, RCMF (gpm)	Bypass for RCF (%)	Treatment Design Capacity for RCF (gpm)	Treatment Average Production Rate for RCF (gpm)	WBA	SBA-on-site	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMF-without recycle	WBA	SBA-on-site	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMF-without recycle	WBA	SBA-on-site	SBA-single pass	RCF-with recycle	RCF-without recycle	RCMF-without recycle	Selected Treatment Technology	Treatment Capital Cost	Total Capital Cost (treatment, pipe, sewer, building and land)	O&M	NPV	Total Annualized Cost (\$M/yr)	Total Water Cost (\$/AF)
Group A	3408-1, 3408-2, 3408-3, 3410-1	Area 26	8500	2280	25%	4,861	1,684	9%	5,991	2,079	\$ 13	\$ 11	\$ 6	\$ 18	\$ 18	\$ 14	\$ 1.3	\$ 0.9	\$ 84.6	\$ 1.7	\$ 0.9	\$ 0.8	\$ 2.3	\$ 1.8	\$ 85.1	\$ 3.2	\$ 1.7	\$ 1.9	WBA	\$ 19	\$ 17.4	\$ 1.3	\$ 33	\$ 3	\$ 731
Group B	4524-1, 4525-1, 4526-1, 4527-1, 4528-1	Dane Palm</																																	

Central Resin Regeneration Facility Estimate

Description		Total
Mechanical Equipment (equipment and installation)		\$ 570,000
Piping (including fittings, valves, supports)		\$ 798,000
Tanks (including concrete pads and regen vessels)		\$ 1,064,000
Truck Unloading Area (including paving and awning)		\$ 383,000
MCC Facility (structural/HVAC/Plumbing/Electrical only, not including equipment)		\$ 126,000
Bathroom/Lunch Facility (structural/HVAC/Plumbing/Electrical and fixtures)		\$ 106,000
Solids Dewatering Facility (structural/HVAC/Plumbing/Electrical)		\$ 91,000
Electrical (Equipment, conduit/wire, testing)		\$ 470,000
Instrumentation (equipment, conduit/wire, testing, start-up)		\$ 109,000
Evaporation ponds (assumed 4 acres)		\$ 925,000
	Subtotal:	\$ 4,642,000
Indirect Costs	25%	\$ 1,160,500
	Subtotal:	\$ 5,802,500
Contractor Overhead	10%	\$ 580,300
	Subtotal:	\$ 6,382,800
Contractor Profit	5%	\$ 319,200
	Subtotal:	\$ 6,702,000
Contract Allowances	5%	\$ 335,100
	Subtotal:	\$ 7,037,100
Bond and Insurance	3%	\$ 211,200
	Subtotal:	\$ 7,248,300
Contingency	30%	\$ 2,174,500
Construction Total		\$ 9,422,800
Trucks (equipment)		\$ 466,000
Total Capital Cost		\$ 9,888,800
Construction Reserve/Change Orders	10%	\$ 988,900
Probable Total Bid Cost		\$ 10,878,000
Engineering	10%	\$ 1,087,800
Construction Management	15%	\$ 1,631,700
Permitting/Training/Other Fees	3%	\$ 326,400
Subtotal		\$ 3,046,000
Contingency	30%	\$ 913,800
Subtotal		\$ 3,960,000
Total Cost		\$ 14,838,000

Assumptions

Backwash and rinse water disposed to sewer or WRP facility (could be reused at additional infrastructure cost)
 Raw unchlorinated well water will be provided at the site from the WRP 4 facility
 Asphaltic concrete for truck unloading area
 Truck unloading area is assumed to be covered but open on all sides
 All tanks are assumed to be at grade with a concrete slab, no additional spill protection is assumed
 2 liquid treatment trains and one solids treatment train
 All piping is assumed above grade on supports
 Utilities are already available on the site and only connections are required
 Equipment costs are based upon previous projects or published prices as noted and include installation
 All pumps/equipment are assumed to be on equipment pads
 Equipment start-up and testing is included as a separate cost
 Gravity thickener is assumed to be a cone-bottomed PE tank
 Assuming no piles are required for any structures
 Assume reuse of excavated material for backfill
 No hazardous or contaminated materials onsite during construction
 All buildings assumed to be CMU construction on buried slab with interior/exterior finishes
 MCC Facility cost includes excavation/slab/structural/electrical/plumbing/finishes but not equipment costs - 420 sq ft
 Bathroom/Lunch Facility cost includes excavation/slab/structural/electrical/plumbing/finishes - 280 sq ft
 Solids Dewatering Facility cost includes excavation/slab/structural/electrical/plumbing/finishes - 160 sq ft
 Evaporation ponds allow a flat site and a balanced use of backfill for berms.

Surface Water Treatment Plant - Treatment Options Comparisons

Treatment System	Capital Cost (million \$)	DAF+GMF	DAF+MF	Floc/Sed+GMF	Floc/Sed+MF
		1	2	3	4
Inlet Pump Station	\$2.7	\$2.70	\$2.70	\$2.70	\$2.70
Coarse Screens	\$1.5	\$1.5	\$1.5	\$1.5	\$1.5
WetWell	\$0.15	\$0.15	\$0.15	\$0.15	\$0.15
Chemical Feed	\$1.25	\$1.25	\$1.25	\$1.25	\$1.25
Pretreatment					
	Floc/Sed	\$17.7	-	\$17.7	\$17.7
	DAF	\$5.8	\$5.8	-	-
Filtration					
	GMF	\$23.1	\$23.1	-	\$23.1
	MF	\$26.7	-	\$26.7	\$26.7
GAC	\$30.3	\$30.3	\$30.3	\$30.3	\$30.3
Clearwell	\$23.5	\$23.5	\$23.5	\$23.5	\$23.5
Distribution Pumps	\$5.64	\$5.6	\$5.6	\$5.6	\$5.6
Sludge Handling Floc/Sed	\$12.3			\$12.3	\$12.3
Sludge Handling DAF	\$9.9	\$9.9	\$9.9		
Total Capital Cost (Million \$, 20 MGD)		\$104	\$107	\$118	\$122

Treatment System	O&M Cost (\$/year)	DAF+GMF	DAF+MF	Floc/Sed+GMF	Floc/Sed+MF
		1	2	3	4
Coarse Screens	-	-	-	-	-
WetWell	-	-	-	-	-
Chemical Feed	\$1.98	\$1.64	\$1.64	\$1.64	\$1.64
Pretreatment					
	Floc/Sed	\$0.29	-	\$0.24	\$0.24
	DAF	\$0.38	\$0.31	\$0.31	-
Filtration					
	GMF	\$0.74	\$0.61	\$0.61	-
	MF	\$1.46	-	\$1.21	\$1.21
GAC	\$1.64	\$1.36	\$1.36	\$1.36	\$1.36
Clearwell	-	-	-	-	-
Distribution Pumps	\$0.49	\$0.41	\$0.41	\$0.41	\$0.41
O&M Cost (Million \$/year, 10 MGD)		\$4.3	\$4.9	\$4.3	\$4.9

Treatment System	O&M Cost (\$/year)	DAF+GMF	DAF+MF	Floc/Sed+GMF	Floc/Sed+MF
		1	2	3	4
Total Capital Cost		103.8	107.5	118.2	121.8
Annualized Capital Cost		7.4	7.6	8.4	8.6
Operating Cost		4.3	4.9	4.3	4.9
Total Annualized Cost		11.7	12.6	12.6	13.5
Annual Production		18.6	18.6	18.6	18.6
Cost (\$/AF)		\$629	\$675	\$680	\$726

Surface Water - Scenario Costs for Selected Treatment Configuration

(Capital costs Based on Peak Plant Capacity)

Treatment System	Capital Cost (\$million)	Mid Valley	East Valley
Inlet Pump Station	\$2.7	\$2.7	\$2.7
Coarse Screens	\$1.5	\$1.5	\$1.5
WetWell	\$0.2	\$0.2	\$0.2
Chemical Feed	\$1.3	\$1.3	\$1.3
Pretreatment			
	DAF	\$5.8	\$5.8
Filtration			
	MF	\$26.7	\$26.7
GAC	\$30.3	\$30.3	\$30.3
Clearwell	\$23.5	\$23.5	\$23.5
Distribution Pumps	\$5.6	\$5.6	\$5.6
Sludge Handling DAF	\$9.9	\$9.90	\$9.90
Total Capital Cost (Million \$, 20 MGD)		\$107	\$107

(Operating Costs based on average plant production)

Treatment System	O&M Cost (\$million/year)	Mid Valley	East Valley
		(10 MGD)	(9.2 MGD)
Inlet Pump Station	\$0.03	\$0.01	\$0.01
Coarse Screens	\$0.00	\$0.00	\$0.00
WetWell	\$0.00	\$0.00	\$0.00
Chemical Feed	\$1.97	\$0.99	\$0.91
Pretreatment			
	DAF	\$0.43	\$0.21
Filtration		\$0.00	\$0.00
	GMF	\$0.83	\$0.41
	MF	\$1.54	\$0.77
GAC	\$1.65	\$0.82	\$0.76
Clearwell	-	-	-
Distribution Pumps	\$0.85	\$0.42	\$0.39
O&M Cost (Million \$/year, 10 MGD)		\$3.6	\$3.4

Treatment System		Mid Valley	East Valley
		(10 MGD)	(9.2 MGD)
Total Capital Cost		107.5	107.5
Annualized Capital Cost		7.6	7.6
Operating Cost		3.6	3.4
Total Annualized Cost		11.3	11.0
Annual Production		11.2	10.3
Cost (\$/AF)		\$1,007	\$1,066

Surface Water Pipelines

East Valley Plant Pipelines				
9.5 miles = 49835 ft				
Pipe Diameter (in)	Cost of Piping (\$/ft/in dia. installed)	Pipe Length Used (ft)	Flow Rate (gpm)	Total Cost
6	\$ 95			
12	\$ 190			
16	\$ 253			
24	\$ 380			
30	\$ 475	10,600	6000	\$ 5,033,940
36	\$ 570			
	\$ 665			
				\$ 5,033,940

Mid Valley Plant				
5.1 miles = 26947 ft				
Pipe Diameter (in)	Cost of Piping (\$/ft/in dia. installed)	Pipe Length Used (ft)	Flow Rate (gpm)	Total Cost
6	\$ 95			
12	\$ 190	10,678		\$ 2,028,393
16	\$ 253			
24	\$ 380	9,708	5400	\$ 3,688,263
30	\$ 475	14,516	8500	\$ 6,893,648
36	\$ 570	3,500	16291	\$ 1,994,580
42	\$ 665			
				\$ 14,604,885